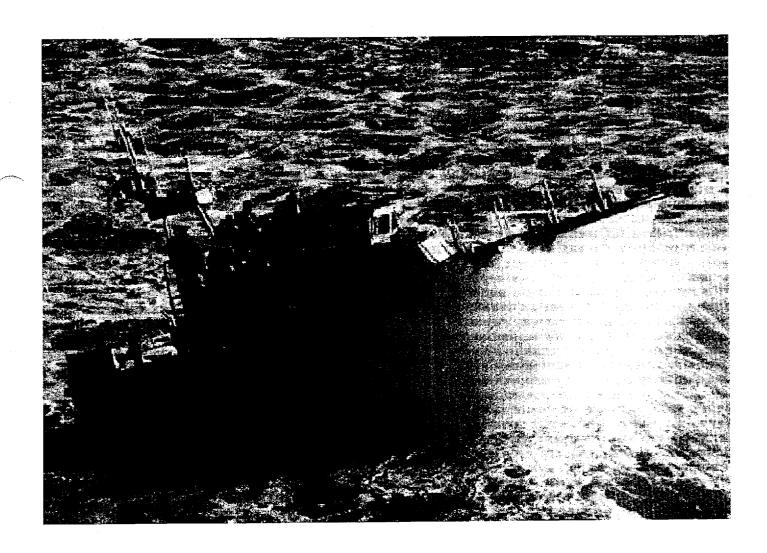
47'MOTOR LIFEBOAT OPERATOR'S HANDBOOK



COMDTINST M16114.25A



	,		

Commandant United States Coast Guard 2100 Second Street, S.W. Washington, DC 20593-0001 Staff Symbol: G-OCS-2 Phone: (202) 267-1584

COMDTINST M16114.25A

JUL 2 1999

COMMANDANT INSTRUCTION M16114.25A

Subj: 47' MLB OPERATOR'S HANDBOOK

- 1. <u>PURPOSE</u>. This instruction provides technical orientation, performance characteristics, and basic operating procedures for the 47' Motor Lifeboat (MLB). It also standardizes boat outfit equipment and layout.
- 2. <u>ACTION</u>. Area and district commanders, commanders of maintenance and logistics commands, commanding officers of headquarters units, assistant commandants for directorates, Chief Counsel, and special staff offices at Headquarters shall ensure adherence to the content of this instruction at all units which operate and/or maintain 47' MLB's. To ensure standardization, there is no command prerogative with regard to the type or location of equipment carried except as noted. All design or structural alterations are prohibited unless specifically authorized by Commandant (G-SEN).
- 3. <u>DIRECTIVES AFFECTED</u>. This manual cancels the 47' MLB Operator's Handbook, COMDTINST M16114.25 on 01 Oct 1999.
- 4. <u>DISCUSSION</u>. This handbook contains the information necessary to safely and efficiently operate the 47' MLB. The operational capabilities, limitations, and emergency procedures are clearly stipulated. The fittings, outfit list, and physical characteristics of the boat are pictured and described in detail. This publication is directive in nature and applies to all 47' MLB crews, operational, and supervisory commands. This handbook revision serves the following purpose:
 - a. It incorporates the changes to the 47' MLB and its authorized outfit which have occurred over the past year.
 - b. It reformats the manual into information mapping style for easy reading and reference.

[DIST	RIBU	TION	- \$1	DL N	lo.13	6																			
	а	Ь	С	d	е	f	9	h	1	j	k	1	m	n	0	р	q	r	s	t	u	٧	W	х	У	z
Α																										
В		8	10		*			2	5					10												
С									20		2			5										1		
D	*			5				50					*									*				
Ε			1					1											10	2						
F																										
G [
н																										

NON-STANDARD DISTRIBUTION Be: Academy:LDC (2); OIC/XPO (2); Da: Greater Antillees Section (5); Dm: Pacarea Trateam (5); Dv: MLB Project Resident Office (5)

COMDTINST M16114.25A JUL 2 1999

- c. It incorporates into Chapter 5 the requirements, responsibilities, and actions to take upon the occurrence of disabling casualties as well as restrictive, major and minor discrepancies. This change is consistent with the new Coast Guard Boat Readiness and Standardization Program which becomes effective on 01 Oct 1999.
- d. It provides an inclusive list and definition of each disabling casualty, restrictive and major discrepancy in Appendices D and E.
- e. It provides the standardized requirements of a full power trial for the 47' MLB in Appendix F.
- 5. <u>PROCEDURE.</u> District, operational and unit commanders for all 47' MLB units shall ensure the procedures and limitations detailed within this instruction are followed. Forward any comments, corrections, recommendations and questions regarding this handbook to the National Motor Lifeboat School in accordance with Section 1.C. of this manual. Design and structural change requests shall be submitted as outlined in the Naval Engineering Manual, COMDTINST M9000.6 (series).

6. <u>POLLUTION PREVENTION (P2) CONSIDERATIONS.</u> Pollution Prevention considerations were examined in the development of this directive and have been determined to be not applicable.

ERNEST R. RIUTTA

Assistant Commandant for Operations

RECORD OF CHANGES

CHANGE	DATE OF CHANGE	DATE ENTERED	ENTERED BY
NUMBER	CHANGE	ENTERED	
	1		
			
	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	

:

ii



Table of Contents

CHAPTER 1: INTRODUCTION	
SECTION A. WARNINGS, CAUTIONS, AND NOTES	1-3
A.1. General	1-3
A.2. Warning	1-3
A.3. Caution	1-3
A.4. Note	1-3
SECTION B. FACILITY MANAGER	1-5
B.1. General	1-5
SECTION C. CHANGES	1-7
C.1. General	1-7
C.2. Boat Alterations	1-7
SECTION D. ACTION	1-9
D.1. General	1-9
CHAPTER 2: BOAT CHARACTERISTICS SECTION A. GENERAL DESCRIPTION	2-3
A.1. Design	2-3
A.2. Manufacturer	2-3
A.3. Missions	2-3
A.4. Boat Specifications	2-3
A.5. Superstructures	2-3
A.6. Hull	2-3
SECTION B. WATERTIGHT COMPARTMENTS	2-7
Forward Peak	2-9
B.1. General	2-9
Forward Compartment	2-10
B.2. Access	2-10
B.3. Interior	2-10
Auxiliary Machinery Compartment	2-12
B.4. Access	2-12
B.5. Interior	2-12
Survivors' Compartment	2-16
B.6. Access	2-16
B.7. Interior	2-16
Engine Room	2-20
B.8. Access	2-20
B.9. Interior	2-20



Lazarette	2_23
B.10. Access	
B.11. Interior	
Enclosed Bridge	
B.12. Access	
B.13. Interior	
SECTION C. OPEN BRIDGE	
C.1. Access	
C.2. Operating stations	
C.4. Windscreen	
C.5. Magnetic compass	
C.6. Seating	2-33
C.7. Binoculars	2-33
C.8. "D" rings	
SECTION D. MAST PLATFORM	
D.1. General	
SECTION E. MAIN DECK EQUIPMENT	
E.1. Bullnose	
E.2. Bitt	
E.3. Chocks	
E.4. Handrails	2-37
E.5. Tow bitt	
E.6. Tow reels	
E.7. Deck lighting	
E.8. Miscellaneous equipment	2-38
SECTION F. MAIN DECK STORAGE	2-39
F.1. Aft buoyancy chamber	
F.2. Forward deck lockers	2-39
F.3. Pump	
1.3. 1 u mp	
CHAPTER 3: BOAT SYSTEMS AND COMPO	NENTS
SECTION A. PROPULSION SYSTEM	3-3
A.1. General	3-3
A.2. Engines	3-4
A.3. Drive shafts	3-4
A.4. Reduction gears	3-4
A.5. Propeller shafts	3-5
SECTION B. DDEC SYSTEM	3-7
B.1. General	3-7
B.2. Major components	3-7
•	

Table of Contents



SECTION C. RAW WATER COOLING SYSTEM	3-11
C.1. General	3-11
C.2. System flow	3-11
SECTION D. ENGINE SYSTEMS	
Engine Coolant System	3-14
D.1. Capacity	3-14
D.2. Block flow	
D.3. Charge air flow	3-14
Engine Lubrication System	3-16
D.4. General	3-16
D.5. Scavenging oil pump	3-16
D.6. How the pump works	3-16
D.7. Flow	3-16
D.8. Pressure regulator valve	
D.9. Vertical gallery	3-17
D.10. Main gallery	
Engine Combustion Air System	
D.11. General	
D.12. Blower	
D.13. Turbocharger	3-18
D.14. Air flow	
Engine Exhaust System	3-20
D.15. General	
D.16. Exhaust gas silencer	3-20
SECTION E. FUEL OIL SYSTEM	3-21
E.1. General	3-21
E.2. Fuel tank	3-21
E.3. Fuel oil supply	3-21
SECTION F. HYDRAULIC STEERING SYSTEM	3-23
F.1. General	3-23
F.2. Manual system operation	3-23
F.3. Power assisted system operation	3-23
F.4. System reservoir	3-24
SECTION G. HEATING, VENTILATION, AIR CONDITIONING SYSTEM (HVAC)	3-25
G.1. General	3-25
G.2. Control units	3-25
G.3. Raw water system	
SECTION H. ELECTRICAL SYSTEM	3-27
H.1. General	
H.2. AC power sources	3-27
H.3. DC power sources	
H.4. Power panels	3-29



SECTION I. EMERGENCY SYSTEMS	3-33
Emergency Window Release System	
I.1. General	
I.2. System configuration	
I.3. Testing	
I.4. Re-arming	
Engine Room Fire Suppression System	
I.5. General	
I.6. Storage location	
I.7. Activation	
I.8. System flow	
Installed Dewatering System	<i>3-38</i>
I.9. General	
I.10. Bilge pump selector switch	3-38
I.11. Location of pumps and panel	3-38
I.12. P5 portable pump	3-38
Bilge Flooding Alarm System	3-40
I.13. Sensors	3-40
I.14. Operation	3-40
I.15. Location	3-40
I.16. Spaces	3-40
Firefighting	3-42
I.17. Policy	3-42
·	
CHAPTER 4: THE CREW	
SECTION A. MINIMUM CREW	4-3
A.1. General	4-3
A.2. Qualified/ certified crewmembers	4-3
A.3. Non-qualified/ certified crewmember	4-3
A.4. Additional crewmembers	4-3
SECTION B. COXSWAIN	4-5
B.1. General	4-5
B 2 Authority and responsibility	4-5
B.3. Relief of responsibility	4-5
SECTION C. ENGINEER	4-7
C1 General	4-7
C 2 Qualifications	
C.3. Responsibilities	4-7
SECTION D. CREW MEMBERS	4-9
D.1. General	4-9



SECTION E. PASSENGERS AND SURVIVORS	4-11
E.1. General	4-11
SECTION F. TRAINING	4-13
F.1. General	4-13
F.2. Standards for qualification	4-13
F.3. Training underway	4-13
SECTION G. SAFETY EQUIPMENT	
G.1. Personal protective equipment	4-15
G.2. Protective equipment during heavy weather	4-15
G.3. Protective equipment in surf	
CHAPTER 5: OPERATIONAL GUIDELINE	E S
SECTION A. OPERATING PARAMETERS	
A.1. General	
A.2. Disabling casualties	
A.3. Restrictive discrepancies	
A.4. Major discrepancies	
A.5. Minor discrepancies	
A.6. Responsibilities	
A.7. Environmental limits	
SECTION B. PERFORMANCE DATA	
B.1. Fuel consumption	
B.2. Seakeeping	
B.3. Turning	
B.4. Stability	
B.5. Acceleration	
B.6. Speed	
B.7. Deceleration	5-12
CHAPTER 6: MISSION PERFORMANCE	
SECTION A. STARTING PROCEDURES	
	6-3
A.2. Engine starting	
A.3. Energizing equipment	
SECTION B. UNDERWAY	
B.1. General	
B.2. Personal protective gear	
B.3. Communication	
B.4. Changing control stations	6-7



SECTION C. HANDLING CHARACTERISTICS	6-9
Turning and Pivoting	6-10
C.1. General	
C.2. Jog levers	
C.3. Split throttle turn	
C.4. Restricted maneuvering.	
Head seas	
C.5. General	6-12
C.6. Speed	6-12
C.7. Quartering the seas	6-12
Stern to Seas	
C.8. General	
C.9. Using the stern for alternative options	
C.10. Riding the back of a wave	
Beam Seas	
C.11. Steering	
Effects of Wind	
C.12. Turning the bow	
Station Keeping	6-16
C.13. General	6-16
SECTION D. SURF OPERATIONS	
D.1. General	
D.2. Recognizing a wave	6-17
D.3. Outbound in waves under 14'	6-17
D.4. Outbound in waves over 14'	
D.5. Inbound	
D.6. Stern to station keeping	6-18
Section E. Towing	6-19
E.1. General	6-19
E.2. Approaches	6-19
E.3. Affects of wind with vessel in tow	6-20
E.4. Tow watch	6-20
SECTION F. ANCHORING	6-21
F.1. General	6-21
F.2. Anchoring the boat	6-21
F.3. Weigh anchor	6-21
SECTION G. HELICOPTER OPERATIONS	6-23
G.1. Hoist working area	6-23
G.2. Crew placement	6-23
G.3. Procedures	6-23

Table of Contents



SECTION H. PERSONNEL RECOVERY	6-25
H.1. Pick-up ports	6-25
H.2. Controlling the boat	6-25
H.3. Deck recess	
SECTION I. ICE CONDITIONS	
I.1. General	6-27
SECTION J. SECURING PROCEDURES	6-29
J.1. Procedure	
CT DESCRIPTION OF THE PROPERTY OF THE PROPER	
CHAPTER 7: EMERGENCY PROCEDURES	
SECTION A. CAPSIZING	7-3
A.1. Preparation	7-3
A.2. Recovery	7-3
A.3. Actions	7-3
SECTION B. STRIKING A SUBMERGED OBJECT	
B.1. General	7-5
B.2. Action	7-5
SECTION C. STEERING CASUALTY	
C.1. Symptoms	7.7
SECTION D. REDUCTION GEAR FAILURE	
D.1. General	
D.2. Actions	
SECTION E. FIRE IN THE ENGINE ROOM	
E.1. Symptoms	7 11
E.2. Actions	
SECTION F. FIRE IN THE AUXILIARY MACHINERY SPACE	
F.1. Actions	
SECTION G. LOSS OF CONTROL OF ENGINE RPM	
G.1. Actions	
SECTION H. LOSS OF FUEL OIL PRESSURE	
H.1. Symptoms	7-17
H.2. Actions	7-17
SECTION I. LOSS OF LUBE OIL PRESSURE	7-19
I.1. Actions	7-19
SECTION J. MAIN ENGINE HIGH WATER TEMPERATURE	7-21
J.1. Actions	7-21
J.2. Raw water system checks	7-22
J.3. Jacket water system checks	7-22
SECTION K. EXCESSIVE SHAFT SEAL LEAKAGE	7-23
K.1. Actions	7-23



	7-25
APPENDIX A:	47' MOTOR LIFEBOAT OUTFIT LIST & STOWAGE PLAN
APPENDIX B:	47' MOTOR LIFEBOAT BOAT ALTERATIONS (BOATALTS)
APPENDIX C:	47' MOTOR LIFEBOAT MATERIEL INSPECTION CHECKLIST
APPENDIX D:	DISABLING CASUALTIES
APPENDIX E:	RESTRICTIVE AND MAJOR DISCREPANCIES
APPENDIX F:	FULL POWER TRIAL



Chapter 1 Introduction

Overview

Introduction

This handbook contains information necessary for the safe and efficient operation of the 47' Motor Lifeboat (MLB). It defines operational capabilities, limitations, and emergency procedures. In addition, it shows or describes the fittings, outfit list, and physical characteristics of the boat.

In this chapter

This chapter contains sections.

Section	Торіс	See Page
A	Warnings, Cautions, And Notes	1-3
В	Facility Manager	1-5
С	Changes	1-7
D	Action	1-9

Operators Manual - 47'MLB





Section A. Warnings, Cautions, And Notes

A.1. General

The following definitions apply to Warnings, Cautions, and Notes found throughout the handbook.

A.2. Warning

WARNING ♥

Operating procedures or techniques that must be carefully followed to avoid personal injury or loss of life.

A.3. Caution

CAUTION!

Operating procedures or techniques that must be carefully followed to avoid equipment damage.

A.4. Note

NOTE &

An operating procedure or technique essential to emphasize.

Chapter 1 - Introduction





Section B. Facility Manager

B.1. General

Commandant (G-OCS) is the facility manager for the 47' MLB. The 47' MLB is a standard boat as defined in the Boat Management Manual, COMDTINST Ml61l4.4 (series), and the Naval Engineering Manual COMDTINST M9000.6 (series). COMDT (G-OCS) also oversees the National Motor Lifeboat School (NMLBS). In addition to training coxswains to operate the MLB, NMLBS provides expertise in all aspects of the boat's operation and maintenance. NMLBS reviews the boat, its equipment, crew procedures, operational reports and technical manuals continuously to update this information. NMLBS also provides expertise for standardization and inspection through the MLB Standardization Team.

Chapter 1 - Introduction





Section C. Changes

C.1. General

COMDT (G-OCS) promulgates this manual and its changes. Submit recommendations for changes to NMLBS via standard letter or electronic mail.

Chapter 1 - Introduction





Section D. Action

D.1. General

Operating and supervisory commands and boat crews will comply with the procedures and limitations specified in this publication and any duly issued changes.

D.2. Configuration control

Configuration control for the 47' MLB is critical for standardization of equipment and safety of operations. The boat's speed, performance and range characteristics are extremely sensitive to excess weight.

NOTE &

To maintain fleet wide standardization, unit commanders shall not change or vary the type or location of equipment carried except where noted. Design or structural alterations are prohibited unless specifically authorized by the Office of Naval Engineering, Commandant (G-SEN).

NOTE &

Prototype testing of 47'MLB configuration changes may only be carried out with the specific authorization of the Office of Naval Engineering, Commandant (G-SEN). Under most circumstances, prototype testing is done at the National Motor Lifeboat School.

Chapter 1 - Introduction





Chapter 2 Boat Characteristics

Overview

Introduction

This chapter describes standard 47' MLB features. The systems described briefly in this chapter are covered in detail in Chapter 3 Boat Systems.

NOTE &

All illustrations in this operator's handbook are for familiarization only. The location of machinery and equipment in these illustrations may not accurately reflect proper placement and installation. Refer to the appropriate blueprint, technical publication or enclosure to this handbook for proper placement.

In this chapter

This chapter contains sections.

Section	Topic	See Page
A	General Description	2-3
В	Main Watertight Compartments	2-7
C	Open Bridge	2-31
D	Mast	2-35
Е	Main Deck Equipment	2-37
F	Main Deck Storage	2-39





Section A. General Description

A.1. Design

The 47' MLB was designed by the Boat Engineering Branch of the USCG Engineering Logistics Center.

A.2. Manufacturer

Textron Marine and Land Systems of New Orleans, LA completed the detailed design and built the 47' MLBs. The prototype craft (CG 47200) went into service in 1990. The pre-production boats (CG 47201-47205) were delivered in 1993-1994. The first production craft (47206) entered service in 1997.

A.3. Missions

The 47' MLB (Figure 2-1) is designed to perform missions in adverse weather and sea conditions. Its primary mission is heavy weather SAR but it is designed to support multi-mission operations.

A.4. Boat specifications

The following provides a list of all 47'MLB boat specifications.

A.4.a.	Physical
charac	teristics

Length Overall (LOA):	47'11" w/o rubrails	14.7 meters
Length at Waterline:	43'0"	13.1 meters
Beam:	14'0"	4.3 meters
Draft:	4'6"	1.4 meters
Highest Fixed Point Above Waterline:	18'6"	5.6 meters
Highest Point of Mast (DF Antenna):	24'6"	7.5 meters
Highest Point (HF Antenna):	28'4"	8.6 meters
Hoisting Weight:	40,000 pounds (18,132 kg)	
Propulsion Machinery:	Two Detroit Diesel DDEC-III, 6V-	
	92TA diesel engines	(435 bhp @
	2100 rpm)	
Reverse Reduction Gear:	Reintjes, WVS 234 Ureduction	JP, 2:1
Propellers:	Twin, fixed pitch, 4-1	olade

9.1 meters



Fuel Tank Capacity: 394 gallons (1577 liters)

373 gallons (1666 liters) at 95%

Potable Water: 5 gallons (21 liters)

Crew Capacity: 4 people Survivor Capacity: 5 people

A.4.b. Operating characteristics

Maximum Speed: 25 knots at 2100 rpm Cruise Speed: 21.5 knots at 1950 rpm

Maximum Range at Cruise Speed: 200 Nautical Miles

Maximum Winds: 50 knots (sustained)
Maximum Seas: 30 feet

Maximum Surf: 20 feet 6.1 meters

Maximum Towing Capacity: 150 displacement tons

Outside Air Temperature: 10°F (-12°C) to 95°F (35°C) dry

bulb

Outside Water Temperature: 28°F (-2°C) to 85°F (29°C) dry bulb

A.5. Superstructure

The boat's superstructure is made of 5456 marine aluminum and contains the survivors' compartment, enclosed steering station, and open steering station. It is fixed to the hull at frame 3 (aft) and frame 12 (forward). The mast platform is attached to the superstructure at frame 3 and frame 5. The radar antenna and fold down mast are connected to the mast platform.

A.6. Hull

The boat's hull is made of 5456 marine grade aluminum. The hull's design is deep-V planing from bow to stern with frames numbered from transom to bow. The deepest draft is 4' 6" at the propeller shaft strut extensions. The propulsion system is a "U" drive configuration. Each propeller shaft runs aft from the reduction gear, penetrates the hull between frames 3 and 4 and carries a 28" x 36" four-bladed propeller.

A.6.a. Hull construction

The hull consists of ⁵/16" bottom plating, ¹/₄" side shell, ³/₈" chine plates and ¹/₂" keel plate The MLB has a fixed fender system (rub rails) to protect the exterior of the hull and other vessels during alongside work.

A.6.b. Hull reference points

Frames are numbered from transom to bow at roughly 30" intervals (varies somewhat from frame to frame).

Item	Location
Spray rails	Welded to the hull just above the
	waterline from the bow to frame 11



Item	Location	
Boat's numbers, a Coast Guard	On each side of the hull between frames	
identification stripe with emblem,	9 and 15.	
and "U.S. COAST GUARD" in		
black letters		
Boat's number and station name	Displayed on the stern	
Fixed fenders or "rub rails" ("D"	At the gunwale level from the bow to	
shaped ionomer foam attached to	frame 7, around the stern to frame 1, and	
studs welded to the hull)	at the recess gunwale from frames 3 to 9.	
Survivor's compartment sink	Overboard port side at frame 5, just	
discharge	below and aft of the recess step	
Overboard discharges for the	• frame 11, starboard side (forward	
bilge pumps	compartment);	
	• frame 9 port side (auxiliary	
	machinery compartment);	
	• frame 3, port and starboard (engine	
	room); and transom (lazarette)	
Depth sounder transducer	Between frames 7 and 8 to port of the	
_	fuel tank	
Speed log	Between frames 7 and 8 to starboard of	
	the fuel tank	
Sea suction valves	Between frames 4 and 5 on both sides of	
	the keel in the engine room	
Exhaust ports exit the hull	Between frames 1 and 2, port and	
	starboard sides, just above the waterline	
The boat's deepest draft	Between frames 1 and 2, just aft of the	
_	tow post (at the shaft strut extensions)	
Propellers	Directly under frame 1.	
Rudder posts	Penetrate the hull between frame 1 and	
	the transom.	
Weld marks to mark the 3'	Each side of the hull fore and aft,	
waterline as measured from the	centered 9-3/8" forward of frame 15 and	
keel	4-3/8" aft of frame 1.	



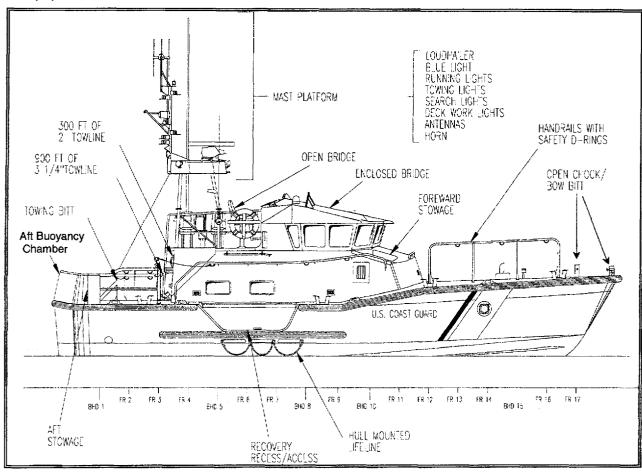


Figure 2-1 47' MLB Outboard Profile



Section B. Watertight Compartments

Introduction

The MLB has seven main watertight compartments separated by bulkheads (Figure 2-2):

- 1. Lazarette. Transom to frame 1.
- 2. Engine room. Frame 1 to frame 5.
- 3. Survivors' compartment. Frame 5 to frame 8.
- 4. Auxiliary machinery compartment. Frame 8 to Frame 10.
- 5. Forward compartment. Frame 10 to frame 15.
- 6. Forward peak. Frame 15 to bow.
- 7. Enclosed steering station. Frame 8 to frame 10 above the main deck.

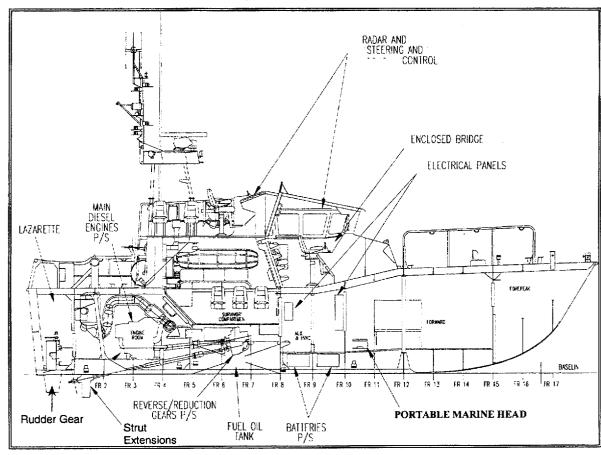


Figure 2-2 MLB Inboard Profile



In addition there are several secondary watertight compartments which aid in self-righting the craft in event of a capsizing. They are the forward deck lockers, the mast platform, the open bridge consoles and the buoyancy chamber.

In this section

This chapter contains general information on the following areas of the boat.

Topic	See Page
Forward Peak	2-9
Forward Compartment	2-10
Auxiliary Machinery Compartment	2-12
Survivors' Comparment	2-16
Engine Room	2-20
Lazarette	2-23
Enclosed Bridge	2-25



Forward Peak

B.1. General

The forward peak, or forepeak, is a buoyancy chamber accessed through an inspection cover at bulkhead 15. The compartment is naturally ventilated with a 2" check vent.



Forward Compartment

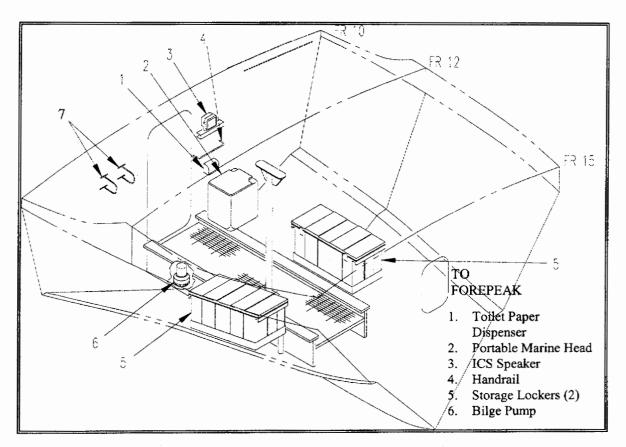


Figure 2-3
Forward Compartment

B.2. Access

A quick-acting watertight escape hatch is in the weather deck at frame 15 to starboard of the centerline. A T-handle wrench, stowed in the port forward deck locker, is used to open and close the hatch from above. A hand wheel operates the hatch from below. A safety catch secures the hatch in the open position. A Quick Acting Water Tight Door (QAWTD) provides access to and from the Auxiliary Machinery Space on the centerline at bulkhead 10.

B.3. Interior

The following items are found in the interior of the forward compartment.

B.3.a. Egress ladder

An egress ladder is to starboard of the centerline under the escape hatch on bulkhead 15.



B.3.b. Stowage boxes	Stowage boxes are located on both sides of the deck grating at frame 12. The port box contains spare oil (2104 and hydraulic) in five and one gallon plastic cans respectively, a damage control kit, and three sets of hearing protection. The starboard box contains four wool blankets, two pillows, a boat pyrotechnics kit IAW COMDTINST M8000.2 (series), a bell, a mouth operated fog horn, and a hand held spotlight.
B.3.c. Sanitary	A portable marine head is to port of the watertight door at frame 10. A toilet paper dispenser is on the bulkhead.
B.3.d. Safety equipment	Four adult type III PFDs with four crewmember pyro vests IAW COMDTINST M10470.10 (series) are secured on the port overhead handrail. Four heavy weather safety belts are secured on bulkhead 15 or kept readily accessible secured in the survivors compartment or enclosed bridge.
B.3.e. Bilge pump	A 33 GPM electric bilge pump is starboard of the keel at frame 10.
B.3.f. Loudhailer	The loudhailer/intercom speaker is on the port side of bulkhead 10 just below the overhead.
B.3.g. Ventilation	The compartment is naturally vented. The forward dorade vent is between frame 14 and 15 on the port side overhead. The aft vent is on the port side of bulkhead 10.
B.3.h. PFDs	Five adult and five child type I personal flotation devices (PFDs) are secured on brackets starboard side of the hatch on Bulkhead 10.



Auxiliary Machinery Compartment

B.4. Access

A QAWTD provides access to and from the forward compartment at bulkhead 10 on the centerline. A second QAWTD provides access to and from the survivors' compartment at bulkhead 8 on the centerline.

B.5. Interior

The following items are found in the interior of the auxiliary machinery compartment.

B.5.a. Shore breaker power panel

The shore power main circuit breaker panel is mounted on the port shell plating at frame 9.

B.5.b. Bilge pump

A 33 GPM electric bilge pump is at frame 8 to starboard of the keel. The pump's overboard discharge is on the port side shell plating between frames 8 and 9.

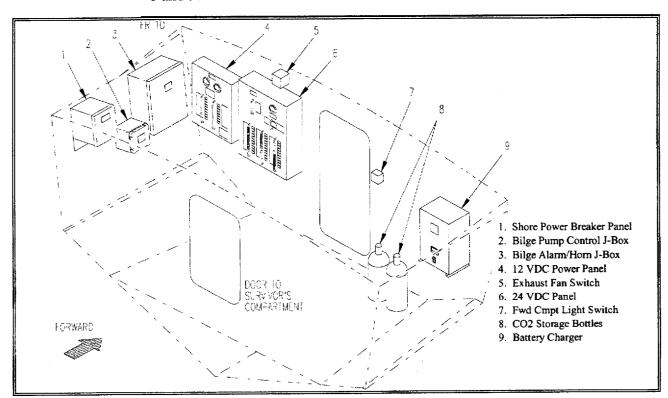


Figure 2-4
Aux Machinery Space Fwd View



B.5.c. 12-Volt DC power panel	The 12-volt power panel is outboard of the 24-volt power panel on bulkhead 10. In the top face of the panel are amperage and voltage meters.		
B.5.d. Ventilation	The compartment uses forced ventilation. A vent fan and ducting are on bulkhead 10 to starboard of the watertight door. Air intake ducting is on bulkhead 8 to port of the watertight door. The exhaust fan switch is located on bulkhead 10, above the 24-volt power panel.		
B.5.e. 24-Volt DC power panel	A 24-volt power panel is on bulkhead 10 to port of the watertight door. In the top face of the panel are amperage and voltage meters.		
B.5.f. Lighting	A three-way light switch located in the survivors' compartment to starboard of the watertight door at bulkhead 8 controls lighting for the auxiliary machinery space.		
B.5.g. CO ₂ fire suppression system	The CO ₂ fire suppression system includes two 25lb storage bottles that are located on bulkhead 10 to starboard of the forward compartment watertight door.		
B.5.h. Battery charger	The battery charger is outboard of the CO ₂ system on bulkhead 10. This unit can charge both banks of batteries.		
B.5.i. DDEC controls	The DDEC Engine Room Interface Module and Electronic Gear Interface Modules (2) are mounted on the starboard shell plating between frames 8 and 9.		
B.5.j. Sea power controls	The Sea Power remote control and conversion units (2 each) are mounted in bulkhead 8, to starboard of the watertight door.		
B.5.k. 120-Volt AC power receptacle	An AC Power receptacle is located on the port side of bulkhead 8, just outboard of the QAWTD.		
B.5.1. Isolation transformer	The isolation transformer for the shore power system is mounted on bulkhead 8 to port of the QAWTD.		
B.5.m. 120-Volt AC power panel	The 120-volt power panel is on bulkhead 8 to port of Isolation Transformer.		



B.5.n. Batteries

The service and start batteries are between bulkheads 8 and 10 directly over the keel. They are 12-volt batteries connected in series to provide 24 volts and are housed in individual battery boxes. Each bank operates independently of the other and can be connected using the parallel switch if one bank is dead. Battery control and parallel switches are located in the survivors' compartment space on bulkhead 8. Deck grating is mounted over the battery boxes.

B.5.o. HVAC system

The raw water valve, strainer and pumps for the HVAC system are mounted at frame 9, to starboard of the battery box.

B.5.p. Emergency window release system (EWRS)

The EWRS Compressor system is mounted on a pedestal on the outboard starboard side of bulkhead 8.



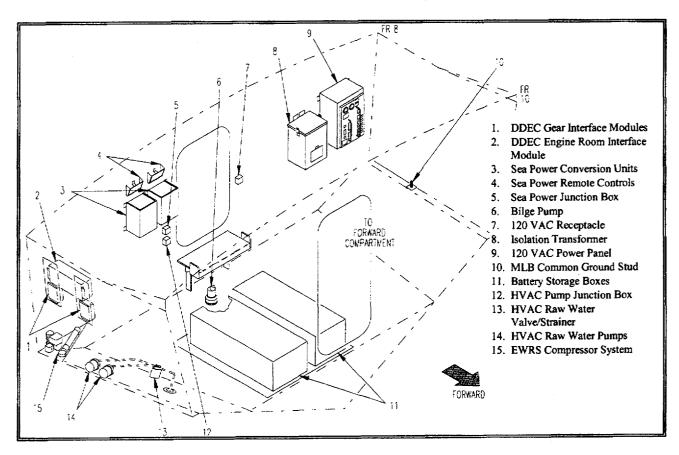


Figure 2-5
Aux Machinery Space, Aft View



Survivors' Compartment

B.6. Access

A QAWTD provides access to and from the aft deck. This QAWTD is at bulkhead 5 above the main deck on the starboard side of the compartment. A second QAWTD provides access to and from the enclosed steering station, it is located on the starboard side of bulkhead 8 above the main deck.

B.7. Interior

The following items are found in the interior of the survivors' compartment.

B.7.a. Seating

The compartment has seating for five survivors, three on the port side and two on the starboard. The seats are jump seat style with safety belts at each position.

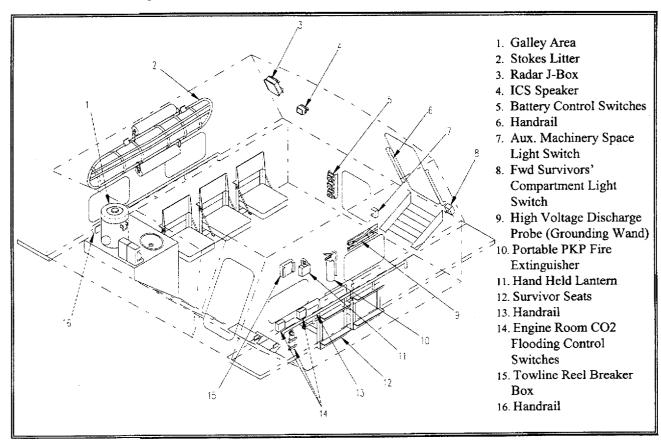


Figure 2-6
Survivors' Compartment, Fwd View



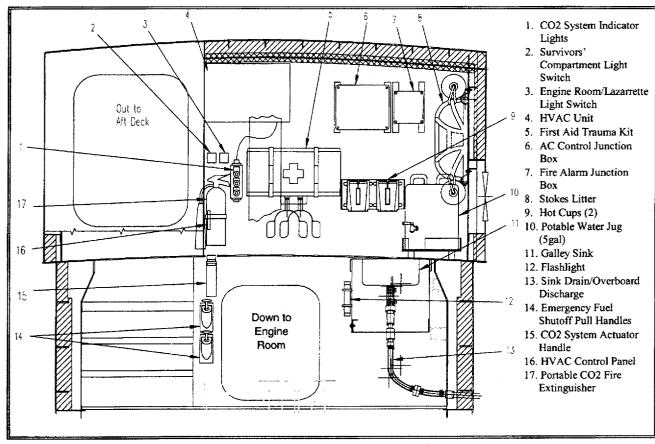


Figure 2-7
Survivors' Compartment, Aft View

B.7.b. Galley

A five gallon water jug, sink and two hot cups are on the port side aft at bulkhead 5. The sink has an overboard discharge.

NOTE &

The discharge from the galley sink leads directly overboard. Waste such as garbage and trash should not be sent down the sink.

B.7.c. Litter

A stokes litter is secured on the port side above the windows. A rescue swimmer's pack is attached to the litter. Stowed with this should be a swimmer's mask, fins and safety harness IAW COMDTINST M10470.10 (series).

B.7.d. First aid kit

A first aid kit is mounted on bulkhead 5 over the watertight door to the engine room.



B.7.e. Hearing protection

Two sets of muff style hearing protection are hung on bulkhead 5 directly over the watertight door to the engine room.

B.7.f. Fire extinguishers

A 5-lb CO₂ fire extinguisher is on bulkhead 5 to port of the aft survivors' compartment watertight door. A 10-lb PKP fire extinguisher is on the starboard shelf at frame 6.

B.7.g. Loudhailer The loudhailer/intercom speaker is on the port side of bulkhead 8.

B.7.h. CO₂ fire suppression system

CO₂ mechanical actuator is located starboard of the engine room door on bulkhead 5. The 30-second discharge delay control head with manual activation lever is located on the starboard side bulkhead aft of the survivors' seats. The CO₂ System Light Panel is located above the watertight door leading to the engine room.

B.7.i. HVAC system

A self-contained heating and air conditioning unit is located on the overhead in front of bulkhead 5 above the engine room door. This unit provides heating, cooling and ventilation for the space. The control unit is located between the ladder leading to the aft deck and the watertight door leading to the engine room.

B.7.j. Battery system

On bulkhead 8, port of the watertight door to the auxiliary machinery space are the service and start system battery cutout switches and the battery parallel switch.

B.7.k. Fuel shut offs

Remote fuel shut off pull cables are located directly between the ladder leading to the aft deck and the watertight door leading to the engine room.

B.7.1. Ducting

Vent ducting on bulkhead 8 passes through the survivors' compartment for the HVAC unit in the enclosed steering station. The ducting provides makeup air for under the port and starboard open bridge consoles.

B.7.m. Lighting

A three-way light switch for compartment lighting is located inboard of the watertight door leading to the aft deck; a second control switch is located outboard of the watertight door leading to the enclosed bridge. A hand held battle lantern is mounted on the starboard bulkhead, above the aft window. A flashlight is mounted on the sink frame.



B.7.n. Tow reel controls	The tow reel breaker and reset switches are mounted on the starboard bulkhead above the aft window.	
B.7.o. High voltage discharge probe	A high voltage discharge probe (grounding wand) is mounted on the starboard bulkhead above the forward window.	
B.7.p. Deck	The deck in the survivors' compartment is removable. It is composed of eight separate locking panels and provides access to the equipment below.	
B.7.q. Fuel tank	The diesel fuel tank is below the removable deck centered on the keel between bulkheads 5 and 8 The tank has a 394 gallon capacity (373 gallons at 95% full) Baffles installed in the tank at frames 6 and 7 control free surface effect (sloshing). Three inspection covers evenly spaced across the top length give access to the tank	
B.7.r. Reduction gear	A Reintjes reduction gear is on each side of the fuel tank between frames 6 and 7. The gear has a 2:1 ratio in forward and reverse. The reduction gear is coupled to the engine by a cardan shaft. The cardan shaft passes through a water restricting seal on each side of the bulkhead.	
B.7.s. Shafts	Each 2.5" propeller shaft is connected to the stub shaft (spacer) which connects to the reduction gear output flange. The shaft enters the stern tube at bulkhead 5 and exits the hull between frames 4 and 3 in the engine room. Watertight integrity is maintained between the shaft and the stern tube by a drip-less seal.	
B.7.t. Spare parts/chow boxes	An engineer's spare parts box and a chow box containing emergency rations are stowed in the gear space on top of the fuel tank.	
B.7.u. Bilge pumps	A 33 GPM electric bilge pump is in each reduction gear space at bulkhead 5 next to the fuel tank. The pump discharge piping penetrates bulkhead 5 outboard of the port and starboard cardan shafts. It is connected to the engine room bilge system discharge piping.	
B.7.v. Depth sounder/speed log	The depth sounder and Speed Log transducers are to port and starboard (respectively) of the fuel tank between frames 7 & 8.	



Engine Room

A QAWTD at bulkhead 5 on the centerline provides access to and from the survivors' compartment. A QAWTD provides access to and from the lazarette at bulkhead 1 on the centerline.	
The following items are found in the interior of the engine room. (See figure 2-8.)	
Two Detroit Diesel 6V92TA DDEC engines are mounted facing aft from frame 3 to frame 4	
Each engine drives a 28 volt 220 amp alternator and a 5 kW generator. The alternator produces the boats electrical power. The generator provides power for the HVAC system.	
Each raw water valve is located on the opposite side of the keel as the engine it serves between frame 4 and 5, below the step.	
Port and starboard sea strainers are between frames 4 and 5 on the port and starboard inboard girders.	
Fuel oil is drawn from the tank through two emergency fuel stop valves. The valves are located 12" above either side of the keel on bulkhead 5.	
The primary fuel filters are between frames 3 and 4 on the port and starboard inboard girders.	
A DDEC Marine Interface Module and Engine Control Module are mounted on both port and starboard engines.	
A 3 GPM centrifugal vane pump is driven by the each engine. A separate electrically driven hydraulic pump mounted just above the chine at bulkhead 2 supports the auto-pilot system.	



B.9.i. Hydraulic fluid reservoir, filter and cooler

A hydraulic fluid reservoir, filter and cooler assembly are located below the overhead on the starboard side shell plating between frames 2 and 3. Raw water is provided to this as a cooling agent.

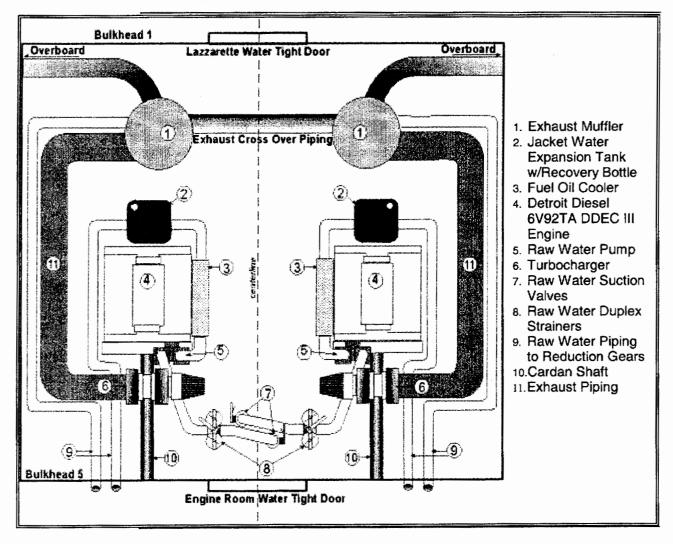


Figure 2-8
Engine Room

B.9.j. Bilge pumps

Two 33 GPM electric bilge pumps provide engine room dewatering. One is at bulkhead 5 to port of the keel. The other is to starboard of the keel between frames 1 and 2. Pump discharges are piped overboard on the port and starboard sides. The discharge piping from the survivors' compartment connects to this system.

B.9.k. Tool box

An engineer's tool box is secured in a bracket on the starboard side aft deck, directly under the muffler.



B.9.1. Standpipe

A standpipe inboard the starboard girder forward of bulkhead 1 is used with the P-5 pump for alternative engine room dewatering.

B.9.m. Exhaust system

Two water trap exhaust mufflers are on bulkhead 1 outboard of the port and starboard girders. The mufflers are cross-connected to provide exhaust discharge when one port is under water. Exhaust discharges through the shell plating between frames 1 and 2 just above the water line.



Lazarette

B.10. Access	Access to and from the lazarette is through a QAWTD on the centerline in bulkhead 1.
B.11. Interior	The following items are found in the interior of the lazarette. (See figure 2-9.)
B.11.a. Rudder posts	Two rudder posts are outboard of the port and starboard girders between the transom and bulkhead 1. A packing gland is on top of each rudder post to provide a watertight seal against the rudder stock. An aft leading tiller is attached to each rudder post.
B.11.b. Rudder tie rod attachment	A tie rod attachment connects the port and starboard tillers.
B.11.c. Rudder angle indicators	A manual steering rudder angle indicator sending unit is outboard of the port rudder post. It senses rudder position using a separate tie rod attachment to the port rudder quadrant and is adjustable. A second rudder angle indicator sending unit for the auto-pilot system is inboard of the port rudder post. It senses rudder position using a separate tie rod attachment to the port rudder quadrant and is adjustable.
B.11.d. Servo power cylinder	The servo power cylinder of the hydraulic steering unit is mounted between the starboard tiller and the centerline. The servo ram connects the power cylinder to the starboard tiller forward of the tie rod attachment.
B.11.e. Ventilation	The compartment is naturally ventilated using a 2" check vent.
B.11.f. Standpipes	The raw water standpipe for the main deck P-5 pump fire fighting water penetrates the hull at a mid point between the shell plating and the starboard girder just aft of bulkhead 1. The engine room dewatering standpipe penetrates bulkhead 1 to starboard of the watertight door. The engine room dewatering standpipe penetrates bulkhead 1 to starboard of the watertight door.



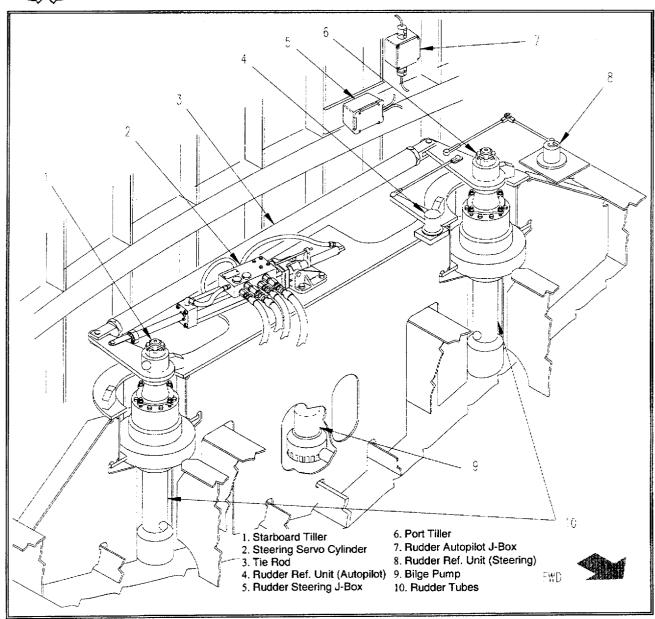


Figure 2-9 Lazarrette



Enclosed Bridge

B.12. Access

Two locations give access to the enclosed bridge. A QAWTD from the open bridge is to port of the centerline. A four-step aluminum ladder with hand grabs to either side of the door leads into the compartment. A QAWTD from the survivors' compartment is to starboard of the centerline. The three-step aluminum ladder has hand grabs on both sides of the door.

B.13. Interior

The following items are found in the interior of the enclosed bridge. (See figure 2-10.)

B.13.a. Seating

The compartment has seating for four crewmembers. All seats are equipped with seat belts.

Seating Ty	pes	Position	Responsibility	
Helm chairs- face the main console to port and starboard	Port chair	Coxswain	The coxswain has both helm control and access to all navigation equipment.	
of the centerline	Starboard chair	Helmsman	The helmsman has both helm control and access to all communications equipment.	
Bolster seats- port and starboard of	Port chair	Crewmember	Both allow crewmember and engineer a secure	
the ladder leading to the open steering station	Starboard chair	Engineer	position with easy egress.	



B.13.b. Consoles

There are two console areas in the enclosed steering station. The upper console houses the electronic display modules (EDMs), engine start switches and dimmer controls. Upper console layout is shown in figures 2-10. The lower console in divided into two parts. The main section contains navigation, communications and engine control equipment including the autopilot. A smaller sub-console sits directly on top of the main unit and houses all windshield wiper and heater controls. The layout of the lower consoles in shown in figures 2-11 and 2-12. The central post between the forward windshields contains the depth/speed/heading indicator and the rudder angle indicator.

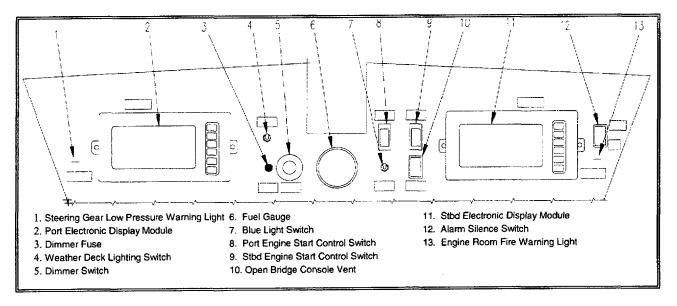


Figure 2-10
Enclosed Bridge - Upper Console



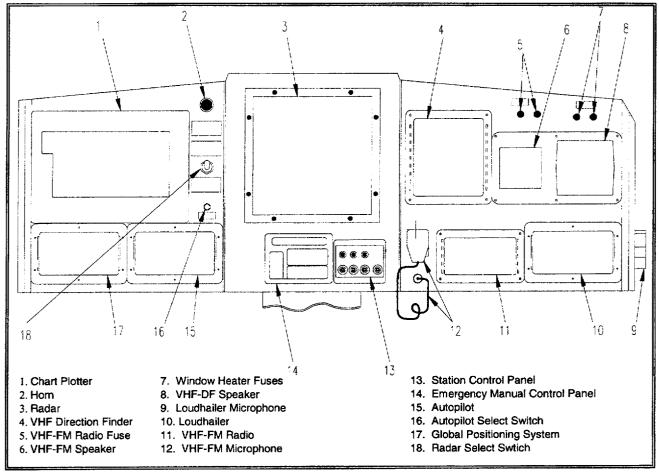


Figure 2-11
Enclosed Bridge - Lower Console

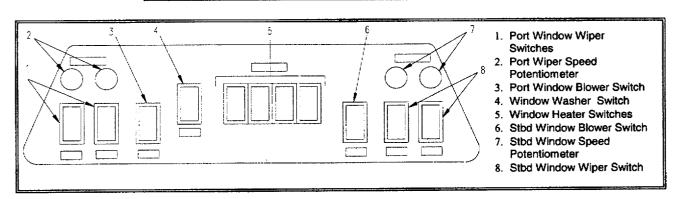


Figure 2-12
Enclosed Bridge - Lower Console (Sub-Unit)



B.13.c. Engine controls

An engine start/stop and throttle control system is mounted on the centerline between the port and starboard helm chairs. A separate emergency engine (manual override) backup switches and controls are mounted directly above the throttles. Emergency engine kill pull cables are mounted on the port and starboard sides of the engine control console. The search light controls are mounted aft of the engine controls. The CO₂ firefighting system activation handle is located aft and below the engine controls.

B.13.d. Windows

The enclosed steering station has 12 windows. The four forward facing windows are heated glass with controls in the lower sub-console. Two opening windows (port and starboard) are abeam of the helm chairs. The windows lock in the open position using a set screw and slide mechanism. They secure using a screw type dog. Two stationary windows (port and starboard) are aft of the opening windows. Two blow-out windows (port and starboard) are aft of the stationary windows. They are controlled by the emergency window release system (EWRS) which automatically releases the windows if the enclosed bridge is flooded in a rollover situation to allow the water to drain out. They can also be manually released using the release pull handles mounted on the overhead direct above the throttle control station. An aft facing window is starboard of the watertight door in bulkhead 8 and a window is in the watertight door itself. The side and aft windows, except for the door are fitted with 24-volt blowers to help control condensation.

B.13.e. Chart table

A chart table is on the port side adjacent to the forward console. In the stowed position the table fits vertically into a receiver locked in place by set screws. When in use the table fits into sockets and extends out over the port helm chair. The table has three height adjustments and is secured in place with set screws. A chart bag with navigation equipment may be hung on the port bulkhead next to the table.

B.13.f. CO₂ system

A CO₂ System Actuator Handle is mounted on the console underside directly below the throttles.

B.13.g. HVAC system

A fan coil unit is on the overhead behind the starboard helm chair. Heating or cooling for both the enclosed bridge and the survivors' compartment are controlled with the HVAC Control Unit mounted on the starboard bulkhead.



B.13.h. Bilge pump alarms/controls	The bilge pump alarm panel and controls are to starboard of the aft facing window on bulkhead 8. Manual, automatic or off may be selected for any pump. The normal underway mode is automatic. Bilge alarm circuit is connected to the boat horn on the mast platform.
B.13.i. Navigation lights	Navigation light controls are to port of the watertight door on the aft bulkhead. A rotary switch may select anchor light, running lights, towing astern (200 meters or less) and inland alongside towing.
B.13.j. HF radio	The HF Radio is mounted on the starboard bulkhead at frame 9.
B.13.k. Binoculars	Binoculars are stowed in a rack on the starboard bulkhead forward of the HF Radio.
B.13.1. Fluxgate compasses	Two fluxgate compasses provide input for the heading indicators and the autopilot system. One compass is mounted on the aft bulkhead above the navigation light controls. A second compass is mounted on the starboard bulkhead above the windows at frame 9.
B.13.m. Fire extinguishers	Fire Extinguishers. A 5 lb. CO ₂ is on the port side of bulkhead 8 next to the navigation light panel. A 10 lb. PKP is on the starboard side superstructure just in front of bulkhead 8
B.13.n. Battle lantern	A battle lantern is mounted on the starboard outboard side of the overhead just forward of the aft window.

Chapter 2 – Boat Characteristics





Section C. Open Bridge

C.1. Access

Two locations give access to the open bridge. Coming from below decks, a quick-acting watertight door from the enclosed bridge is to port of the centerline. A ladder with handrail leads from the aft main deck. A safety line is at the top of the handrail

C.2. Operating stations

The open bridge has port and starboard operating stations and a center console with a radar enclosure below the center console.

C.2.a. Port station

The port operating station (Figure 2-13) has a follow-up jog lever for helm control. The CO₂ firefighting system pull is underneath the console. The throttle control station is on top of the port console. The rudder angle indicator is to port of the throttles. This unit displays the position of the rudder in 1 degree increments. A dimmer switch for the tachometers is mounted above the rudder angle indicator.

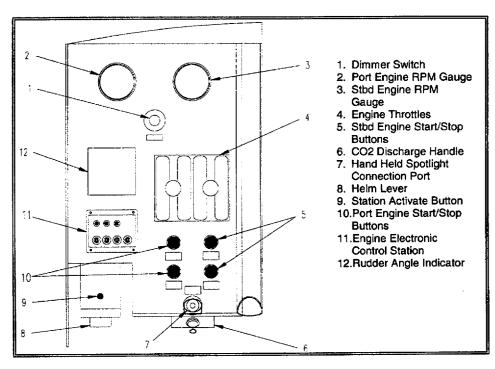


Figure 2-13
Open Bridge, Port Operating Station



C.2.b. Center console

The center console (Figure 2-14) is to starboard of the centerline. The console contains the DDEC electronic display modules (EDMs) which indicate RPMs, engine water temperature, engine oil pressure, reduction gear temperature and reduction gear oil pressure. Engine air shutdown "T" handles and the engine room fire alarm warning light/silence switch are to port of the EDMs. The fathometer (which indicates depth, speed, and temperature) indicator and the heading indicator are to port of the fire alarm controls.

C.2.c. Starboard station

The starboard operating station (figure 2-15) has a steering wheel for helm control. Deck light switches and horn button are inboard of the steering wheel. The autopilot control unit is directly above the steering wheel. The searchlight

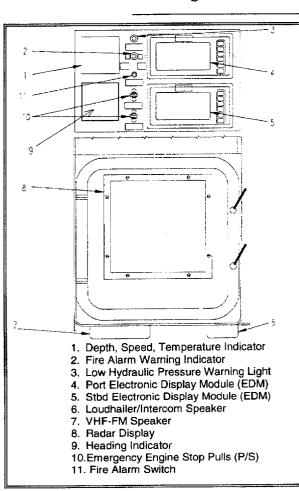


Figure 2-14
Open Bridge, Center Console

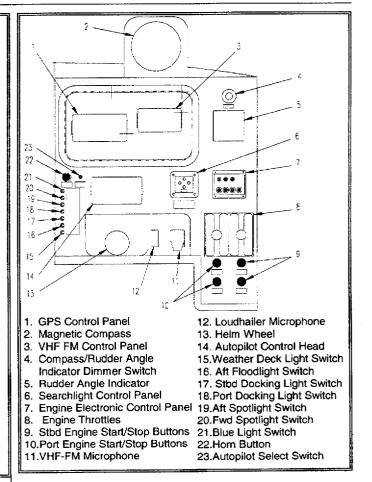


Figure 2-15
Open Bridge, Stbd Operating Station



C.3. Radar enclosure

A radar enclosure is below the center console. A watertight door with a clear plastic face is used to protect the radar from water intrusion.

C.4. Windscreen

A clear lexan windscreen extends across the superstructure in front of the consoles.

C.5. Magnetic compass

A magnetic compass is between the windscreen and the starboard steering station and backs up the electronic heading indicator.

C.6. Seating

There is seating for four crew members: a helm chair in front of each steering station and two jump seats behind the port helm chair. All seating have integral safety belts.

C.6.a. Helm chairs

The helm chairs have multiple adjustments for up and down, fore and aft and can rotate 360 degrees with locking positions each 90 degrees. A positive vertical locking pin ensures no up and down movement during underway operations.

C.6.b. Jump seats

The jump seats can be lowered into a vertical position when not in use to provide more deck space.

WARNING[®]

When raising the crewmember jumps seats into position for use, ensure that the seat bottom drops completely into the locking groove to prevent the seat from collapsing during underway operations.

C.7. Binoculars

Binoculars are stowed in a rack under the starboard operating station console.

C.8. "D" rings

"D" rings are at various locations around the handrails and forward face of the consoles for use with safety belts in heavy weather operations.

Chapter 2 - Boat Characteristics





Section D. Mast Platform

D.1. General

The mast platform is a buoyancy chamber that aids in re-righting the boat in the event of a capsize. The radar antenna, GPS antenna, blue light, forward and aft fixed spot lights, aft deck working lights are all on top of the mast platform. The mast tower is mounted amidships aft on the mast platform. The mast tower can be lowered for maintenance or low clearances by using a block and tackle rig attached to the tow bit. The anchor light, upper and lower masthead light, upper and lower aft facing towing lights, and the stern light are mounted on the mast. The VHF-DF antenna and a remote controlled spotlight are also on the mast tower.

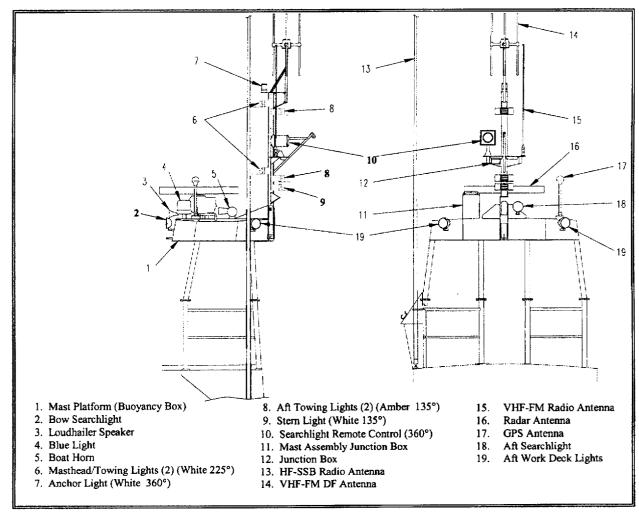


Figure 2-16
Mast Platform

Chapter 2 - Boat Characteristics





Section E. Main Deck Equipment

E.1. Bullnose

A opening bullnose is on the centerline at the bow.

E.2. Bitt

The bitts are located on both port and starboard from forward to aft between frames 16 and 17, at frame 12, between frames 8 and 9, and between frames 2 and 3.

E.3. Chocks

Chocks are located on both port and starboard sides at frame 14, between frames 9 and 10, between frames 3 and 4, and between frames 1 and 2.

E.4. Handrails

Two handrails, leading fore and aft are mounted on the foredeck. Handrails (p/s) on the sides of the superstructure start between frames 10 and 11 and end between frames 3 and 4. An additional handrail runs transversely across the forward foredeck at frame 11. The aft buoyancy chamber encloses the aft deck. The taffrail runs across the transom to frame 3 (p/s). "D" rings are at various locations around the handrails.

E.5. Tow bitt

The tow bitt is just aft of frame 2 centered over the keel between the engine removal hatches on the aft deck. The tow bitt is 30" high. Tow post stiffeners run aft from the post and attach to the deck at the intersection of bulkhead 1. A stanchion in the engine room strengthens the deck.

E.6. Tow reels

Two tow reels are recessed on the port aft corner of the superstructure. The upper reel carries 300' of 2" double braided nylon (DBN) line. The lower electrically powered reel carries 900' of 3.25" DBN line. An electric motor is mounted internally in the lower reel only. The control switch is above the upper reel. A breaker switch and power reset button are located inside the aft survivors' compartment door. A hand crank is secured to the port side of the tow reels. It can be used on either reel.

E.7. Deck lighting

The superstructure has eight steplights that illuminate the deck. There is one light forward just above the deck, superstructure lights (port and starboard) at frame 9 and frame 4 just above the deck, and in the recesses between frames 6 and 7. The controls for the deck lights are on the starboard open steering station.



E.8. Miscellaneous equipment

An HF-FM antenna is on the port side of the superstructure at frame 4. It can be lowered for maintenance and low clearances. Port and starboard running lights are on top of the enclosed steering station overhead between frames 9 and 10. 30" ring buoys are mounted port and starboard at frame 6 on the sides of the open bridge handrails. The distress marker float lights are just forward of the ring buoys. Throw bags are mounted on the open bridge handrails. A diver's knife is mounted on the port stanchion of the ladder from the open bridge to the aft deck. Boat hooks are mounted on both port and starboard sides of the superstructure.



Section F. Main Deck Storage

F.1. Aft buoyancy chamber

A buoyancy chamber at the stern of the boat is 30" high from the main deck to the top of the taffrail. A recess on the starboard side houses the P-5 pump can. The aft buoyancy chamber is divided into three watertight boxes. Each box has a watertight hatch on the forward face with a single dogging handle. Two suction standpipes for the P-5 pump are on the forward face of the starboard hatch on either side. The outboard stand-pipe is used for raw water suction when fire fighting and the inboard is used for engine room dewatering.

F.1.a Port aft deck box

The port aft deck box contains 200' of 2" DBN drogue/grapnel line, 2 drogues (small/large), one roll of marlin, two heaving lines, and chafing gear/assorted shackles as required.

F.1.b. Center aft deck box

The center aft deck box contains a DBN bridle (sized as required), wire/kevlar bridle as required, block and tackle for mast lowering, skiff hook with pendent, and a #4 grapnel hook.

F.1.c. Starboard deck box

The starboard deck box contains one 3" suction hose for connecting the P-5 pump to the standpipe, one 50' discharge hose with a fire fighting nozzle, AFFF inline proportioner (as required).

F.2. Forward deck lockers

A deck locker is on each side of the forward superstructure between frames 10 and 11. A watertight hatch with two dogging handles seals the locker. The hatch can be locked in the open position using a quick release pin on the forward hinge.

F.2.a. Port deck locker

The port deck locker contains a 19-pound Fortress anchor mounted in a bracket. A reel adjacent to the anchor houses 300'of 2½" DBN anchor line. Nine feet of 3/8" stainless steel chain is attached to the anchor and anchor line using 3/8" stainless steel shackles and swivel as ground tackle. Small stuff should be used to secure the chain to the reel to prevent it from vibrating loose in the space. A T-handle for opening the forward compartment watertight scuttle is also located in the locker.



F.2.b. Starboard deck locker

The starboard deck locker contains fenders and alongside lines as required. A minimum of eight alongside and four fenders are required. It also contains the window washer fluid tank.

F.3. Pump

The boat is outfitted with one CG P-5 salvage pump capable of limited fire fighting. The pump is stowed in a pump can on the starboard side of the aft buoyancy chamber. A 3" suction hose is connected to the pump and the raw water standpipe. The fire hose with vari-nozzle is attached to the pump discharge.

WARNING

The P-5 fire fighting capability is intended to only provide personnel protection or to aid in removing survivors from a burning platform



Chapter 3 Vessel Systems

Overview

Introduction

This chapter discusses the boat's mechanical, electrical, and manual operating systems. It describes basic characteristics and provides information to allow the boat's crew to operate effectively.

In this chapter

This chapter contains sections.

Section	Topic	See Page
A	Propulsion System	3-3
В	DDEC System	3-7
С	Raw Water Cooling System	3-11
D	Engine Systems	3-13
Е	Fuel Oil System	3-21
F	Hydraulic Steering System	3-23
G	Heating, Ventilation, Air Conditioning System (HVAC)	3-25
H	Electrical System	3-27
I	Emergency Systems	3-33

Operators Manual - 47'MLB





Section A. Propulsion System

A.1. General

The major components of the propulsion system (figure 3-1) are the two main engines mounted in the engine room, the cardan shafts that pass through bulkhead 5 and couple the engines to the reduction gears, the two reduction gears configured for "U" drive mounted in the survivors' compartment and the propellers and shafts.

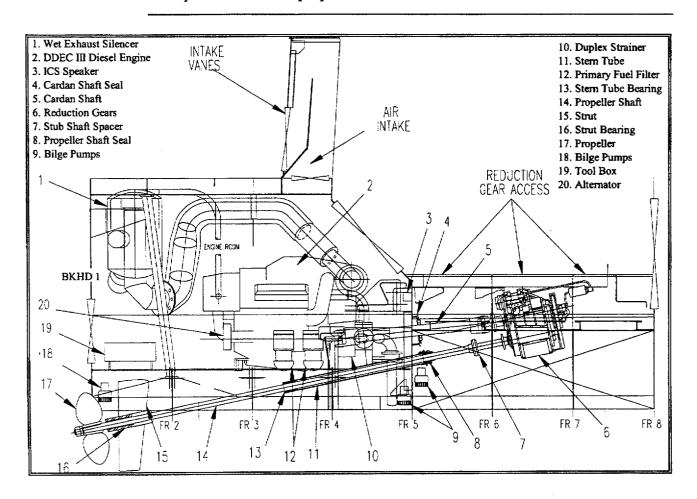


Figure 3-1
Propulsion System (Engine Room & Survivors' Compartment)



A.2. Engines

The 47' MLB is equipped with two Detroit Diesel Electronically Controlled (DDEC) 6V92TA engines. Each is a 6-cylinder, 2-stroke marine diesel with a displacement of 558 cubic inches. These engines are rated for 435 horsepower at 2100 RPM. The engines are separate port and starboard versions; each is right-hand rotating as viewed looking aft from the front of the engine. Coolant capacity is 10-12 gallons and lubricating oil capacity is 5 gallons of 40-weight 2104D. A computer controls all engine combustion functions; it maintains constant engine RPM under variable loads and limits maximum and minimum RPM.

A.3. Drive shafts

A cardan shaft (drive shaft) couples each engine to its reduction gear. The shaft has a splined joint that allows for expansion and contraction. A coupling is mounted to the engine flywheel. This coupling is made of a rubber material and accepts the torsional twist applied to the cardan shaft when the engine accelerates. U-joints at each end of the shaft accept any misalignment. The cardan shaft passes through a water restrictive rubber seal clamped on each side of bulkhead 5.

A.4. Reduction gears

The 47'MLB uses Reintjes WVS 234 UP Marine Reduction gears located in the survivors' compartment to port and starboard of the fuel tank between frames 6 and 7. The gear is a "U" drive unit where the output and input flanges are on the same side of the gear and parallel.

A.4.a. Reduction ratio

A.4.a. Reduction The reduction ratio is 2:1 in forward and reverse.

A.4.b. Control valve

An electronically actuated control valve mounted at the gear box controls gear function as affected by the DDEC system.

A.4.c. Lubricating oil

The gear uses 5.2 gallons of 40-weight lubricating oil MILSPEC 2104D or E for clutch-apply pressure and lubrication.

A.4.d. Temperature

A temperature regulating valve and gear oil cooler maintain oil temperatures between 140-158°F.

A.4.e. Cooler

The cooler is supplied with raw water from the engine raw water system.



A.4.f. Clutchapply pressure

Normal clutch-apply pressure is 250 to 290 PSI. If apply-pressure is lost, the gear is fitted with a come-home device. It is engaged by mechanically locking the clutch together with set screws. In the event of electronic control failure, the control valve can also be operated manually.

A.5. Propeller shafts

Each propeller shaft is 2 ½" inches in diameter and constructed of CRES AQUAMET 22. The reduction gear end is fitted with a flange that is secured to the shaft using one center bolt. Lock wire prevents the bolt from backing out. A stub shaft connects to the reduction gear output flange and is secured with ½" bolts. An aluminum shaft spacer, or spool piece, is between the stub shaft and the prop shaft flange to protect the gear in event of grounding. The prop shaft runs aft from the gear in a stern tube starting at bulkhead 5 and penetrating the hull between frames 3 and 4 in the engine room. A dripless seal encompasses the shaft. The shaft is supported aft by a stainless steel strut with a strut extension to protect the propeller. A 4 bladed, 28" diameter x 36" pitch propeller is at the end of each propeller shaft.

Chapter 3 - Vessel Systems





Section B. DDEC System

B.1. General

DDEC is a computerized electronic engine control, governing and fuel injection system that replaces mechanical controls in a Detroit Diesel engine. It interfaces with the boats installed reduction gear and control systems to provide a complete control package that maximizes the efficiency and performance of the boats propulsion system. DDEC also automatically performs engine protection and self-diagnostic functions to identify malfunctions in its components and provides data to the engineer to aid in troubleshooting engine problems.

B.2. Major components

There are seven major components of the DDEC System (figure 3-2).

B.2.a. Electronic control modules (ECMs)

CAUTION!

The DDEC electronic control system is very sensitive to current/voltage fluctuations and surges. Disconnect all components before conducting any welding on the 47' MLB.

There are two ECMs; they are mounted directly on each engine. Each ECM contains the microprocessor that continuously monitors and controls engine performance and calibration. The ECM receives input from sensors located on the engine that tell it operating information such as turbo boost, timing, oil and fuel temperature/pressure and coolant level/temperature. The ECM sorts this information and provides direction to the electronic fuel injection system to attain the desired performance. Each ECM also contains a back up microprocessor which operates the engine should the main processor malfunction. The ECMs perform the following functions:

- 1. Engine governing.
- 2. Cold start fueling and timing.
- 3. Engine protection and diagnostics.
- 4. Injection timing.
- 5. Rated speed and power.
- 6. Sensor calibrations.
- 7. Smoke control.

B.2.b. Electronic unit injectors (EUIs)

The EUI replace the traditional fuel injectors with an electronically controlled solenoid valve and straight plunger on each injector.



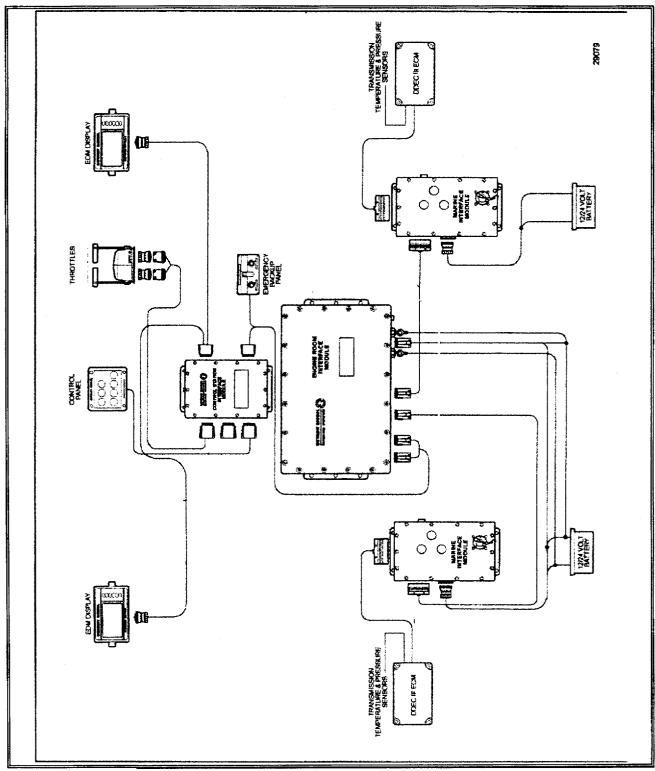


Figure 3-2 DDEC System



B.2.c. Marine interface modules (MIMs)

MIMs mounted on both engines provide the interface between the boat's control systems and the ECM. In addition, the MIM features a diagnostic connector port, which allows the engineer or service personnel to connect the DDEC diagnostic reader to the engine for troubleshooting.

B.2.d. Engine room interface module (ERIM)

The ERIM is located in the Auxiliary Machinery Space. It is the central processor of the control systems (throttles) on the boat. It accepts signals from the three control stations on the boat and commands the engines (through the MIMs and ECMs) to operate at the proper speed. It also directs the clutch actuators to control direction of propulsion.

B.2.e. Control station interface modules (CSIMs)

There are three CSIMs on the 47' MLB; one is located near each throttle station. The CSIM receives signals from the throttles and the throttle control buttons. It sends this information encoded into command signals to the ERIM.

B.2.f. Electronic display modules (EDMs)

The EDMs are the LCD displays mounted in the enclosed bridge and the open bridge. There is one EDM for each engine at each location. They receive information via a connection to the CSIM and display engine RPMs and vital performance data such as oil pressure, engine temperature, transmission oil pressure and temperature, instantaneous fuel consumption and total engine hours.

B.2.g. Electronic gear interface modules

The Electronic Gear Interface Modules are located in the Auxiliary Machinery Space underneath the ERIM. They take electronic signals from the ERIM and actuate the reduction gear clutches.





Section C. Raw Water Cooling System

C.1. General

There are two separate raw water systems on the 47' MLB. The primary system provides cooling for various elements of the propulsion system. A separate raw water system serves the boat's HVAC system; this secondary system is discussed in the HVAC system section of this chapter. The primary raw water system (figure 3-3) carries out five functions:

- 1. Maintains fuel oil temperatures below 90F (32C).
- 2. Removes heat from engine coolant to maintain proper operating temperatures.
- 3. Removes heat from reduction gear lube oil to maintain proper operating temperatures.
- 4. Removes heat from the steering system hydraulic oil to maintain proper operating temperatures.
- 5. Provides cooling and quieting for engine exhaust.

C.2. System flow

Each raw water valve is located on the opposite side of the keel as the engine it services between frames 4 and 5 below the engine room step

Step	Action
1	The raw water flows through a 4" duplex strainer on the port and starboard inboard girders between frames 4 and 5.
2	From the sea strainer, water flows to the raw water pump that has a flow rating of 67 GPM.
3	From the raw water pump, water flows through the fuel cooler and maintains fuel temperature below 90°F.
4	From the fuel cooler, water is piped to the engine heat exchanger where it cools engine coolant.
5	On the outboard side of each engine the flow is divided, one direction leads forward through bulkhead 5 for reduction gear oil cooling, the second flow is restricted and goes to the muffler. On the starboard side, a separate branch provides cooling for the steering system hydraulic fuel reservoir tank.
6	After passing through the oil cooler, the flow returns to the main raw water flow above the bypass line and is then piped to the exhaust system water tank



Step	Action
7	In the water tank, raw water cools and quiets the exhaust and is discharged over the side via the exhaust ports. The water tanks are cross-connected to prevent back pressure if one exhaust port is submerged.

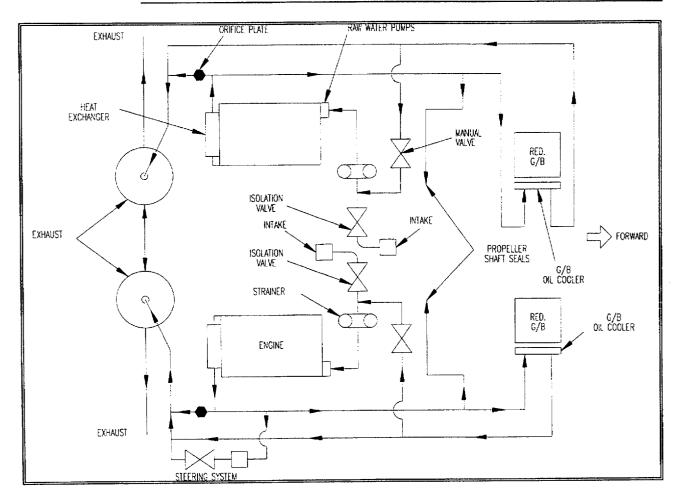


Figure 3-3 Raw Water System



Section D. Engine Systems

Introduction

Operating and supervisory commands and boat crews will comply with the procedures and limitations specified in this publication and any duly issued changes.

In this section

This section contains the following information.

Topic	See Page
Engine Coolant System	3-14
Engine Lubrication System	3-16
Engine Combustion Air System	3-18
Engine Exhaust System	3-20



Engine Coolant System

D.1. Capacity

The Detroit Diesel 6V92TA has a 10-12 gallon capacity closed-circuit cooling system.

D.2. Block flow

The heat exchanger is a reservoir for coolant and a housing for the raw water heat exchanger.

Step	Action
1	The coolant passes across the heat exchanger giving up its heat to the raw water.
2	The coolant is then drawn into the pump.
3	From the pump, coolant flows into the lubricating oil cooler where it maintains the lubricating oil at 200° to 240°F (93° to 115°C).
	Water can bypass the cooler and go directly into the block depending on the temperature of the oil as regulated by a temperature-sensitive valve.
4	From the lubricating oil cooler, coolant flows into the block absorbing the heat from combustion around the cylinder liners.
5	Coolant then flows up from the block into the heads where the fire deck is cooled.
6	The coolant enters the thermostat housing where a temperature- sensitive flow regulator is housed.
7	The 170°F (77°C) thermostat regulates the temperature of the coolant flowing through the block by opening or closing the discharge passage to the heat exchanger.
8	When the engine is warming up, the thermostat will close the passage to the top of the heat exchanger and open the passage directly to the suction side of the pump.
9	The heat exchanger is now taken out of the flow path.

D.3. Charge air flow

The combustion charge air cooling flow is another component of the engine coolant system.

Step	Action
1	Coolant flows from the discharge side of the pump to the after
	cooler mounted in the engine air box below the blower.



Step	Action
2	Charge air from the blower and turbocharger passes across the after cooler, which removes heat. Cooler air is denser and will hold more oxygen for combustion.
3	From the after cooler the flow is piped to the left bank thermostat housing and joins the flow from the block.



Engine Lubrication System

D.4. General

The Detroit Diesel 6V92TA has a closed-circuit, pressurized lubrication system, with a capacity of 5.3 gallons 40-weight lubricating oil.

D.5. Scavenging oil pump

A scavenging-type oil pump is mounted on the two forward main bearing caps and is driven by a gear train from the crankshaft front. The scavenging oil pump is two pumps in a single casing.

D.6. How the pump works

The following is how the pump circulates oil through the engine:

Step	Action
1	The aft or auxiliary pump moves oil from the back of the oil pan to the front of the oil pan over a baffle.
2	The front or main oil pump takes suction from the front of the oil pan through the intake screen and pipe, then into the pump where it is pressurized.
3	The oil then goes from the pump to a short gallery in the cylinder block to the oil cooler adapter plate and to a spring-loaded pressure relief valve mounted on the cylinder block.
4	This valve discharges excess oil to the oil pan when the pressure exceeds 105 psi.

D.7. Flow

The oil flows from the oil cooler adapter plate to the full flow oil filter. Then it flows through the oil cooler and then back into the cylinder block. Here, a short vertical oil gallery and a short diagonal oil gallery carry the oil to the main longitudinal oil gallery through the middle of the block.

Valves are also provided to bypass the oil filter and oil cooler if either becomes plugged.

D.8. Pressure regulator valve

A pressure regulator valve located at the end of a vertical oil gallery stabilizes lubricating oil pressure at all speeds regardless of the oil temperature.

The regulator valve opens when the oil pressure at the valve exceeds 62 psi and discharges oil back to the oil pan.

D.9. Vertical

The vertical gallery is located at the front of the cylinder block on the side



gallery

opposite the oil cooler

D.10. Main gallery

The following steps describes the flow of oil through the main gallery.

Step	Action
1	The pressurized oil flows from the main oil gallery through drilled passages to each main bearing,
2	The oil then passes to an adjacent pair of connecting rods through grooves in the upper main bearing, lower connecting rod bearing and drilled passages in the crankshaft.
3	The rifle-drilled connecting rods carry oil from the connecting rod bearings to the piston pin bushing.



Engine Combustion Air System

D.11. General

The engines are two-stroke marine diesels. For every two strokes of the crankshaft, or one complete up and down cycle of a piston, a combustion cycle takes place. For complete combustion, air must be introduced into the combustion space in the proper ratio. The airflow that pushes exhaust gases through the combustion chambers is called "scavenging air."

D.12. Blower

Air is forced into the engine by an air pump called a blower. The blower is engine driven through the gear train, and supplies pressurized air to a reservoir in the engine block called an air box.

D.13. Turbocharger

The blower itself is not capable of moving enough air to burn the amount of fuel necessary to produce 435 horsepower. To provide the air, the air intake system uses a turbocharger. A turbocharger is an air pump driven by the expelled combustion gases (exhaust) from the cylinders.

Step	Action
1	The exhaust gas expands entering the lower pressure of the exhaust manifold.
2	The exhaust gases travel through the turbine side of the turbocharger, mounted on the exhaust manifold, to escape to the atmosphere.
3	The exhaust gases expand and pass across the turbine driving it at an RPM corresponding to the rate of expansion.

D.14. Air flow

The turbocharger turbine is connected by a shaft to a compressor wheel. The following describes the process of the air flow.

Step	Action
1	As the compressor wheel spins, it draws air into the compressor housing.
2	The air is pressurized and discharged to the air inlet piping.
3	The piping carries the air to the inlet side of the blower.



Step	Action
4	Since the blower is only capable of generating about five PSI and the turbocharger is capable of 20 PSI or more, the blower becomes a restriction. To compensate for this restriction, air flow valves are installed in the blower housing that opens an air flow path around the blower compressor lobes. These valves are called oval blower bypass valves.
5	The pressurized air is now carried around the blower and enters the after cooler. The after cooler is a heat exchanger that removes heat from the pressurized charge air.
6	Engine coolant cools the charge air; it removes about 100 degrees F (37C). Cooler air is denser and can hold more oxygen for combustion.
7	Air then flows from the after cooler to the air box for delivery to the combustion chamber.



Engine Exhaust System

D.15. General

The engine exhaust system (Figure 3-4) is divided into port and starboard subsystems with a crossover system needed for rollovers. Each subsystem consists of a riser assembly attached directly to the engine's turbo charger outlet adapter.

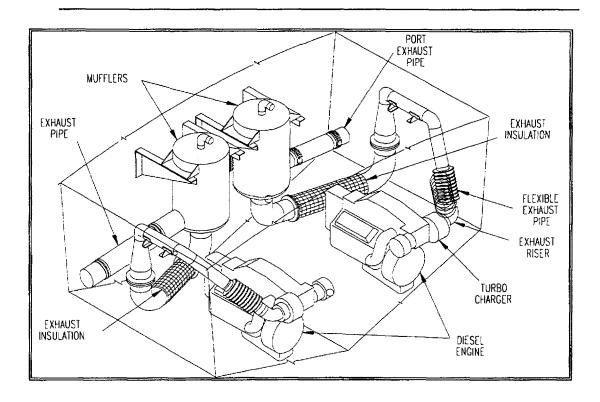


Figure 3-4
Exhaust System

D.16. Exhaust gas silencer

Twin wet exhaust lines are located aft between frames 1 & 2. The exhaust piping angles upwards and enters the mufflers. Through the exhaust gas muffler, gasses percolate upwards through the center of the water chamber (supplied by the raw water system). Exhaust gas and overflow from the water tank flow out through a pipe leading outboard from the tank to through hull fittings on both port and starboard sides. A cross-connect pipe between the two exhaust mufflers reduces back pressure when one exhaust port is submerged. The exhaust mufflers retain water in the event of a rollover to prevent back drainage into the engines.



Section E. Fuel Oil System

E.1. General

The fuel oil system (Figure 3-5) is made of three subsystems. When trouble shooting, it is important to consider these subsystems separately and understand how they interact.

E.2. Fuel tank

The fuel oil tank capacity at 100% full is 394 gallons (373 gallons at 95%). Suction is drawn at a point 2" from the bottom of the tank at frame 6. The fuel pickup has a bonnet to provide suction in the event that the boat capsizes. Baffles are installed at frames 6 and 7 to control free surface effect.

E.3. Fuel oil supply

Fuel oil circulates through the system as follows:

Step	Action
1	Fuel flows from the tank through the emergency fuel oil shut off valves. These valves are spring loaded and are actuated by pull cable from the starboard side of the engine room door in the survivors' compartment.
2	Fuel flows through the fuel filter service valve into the primary fuel oil separators. The fuel oil separators are spin-on type filters with 30 micron rating. A removable clear bowl at the bottom of the filter is used for viewing and draining water and sediment.
3	Fuel travels from the primary filters into the fuel oil pump. The fuel pump is gear-driven off the front of the blower. The pump has an internal relief valve that opens at 62 PSI to protect the pump from over pressurization.
4	Fuel flows from the pump under pressure through the ECM cooler to the secondary 10-micron filter.
5	The flow splits to the fuel injection system in each cylinder head.

E.4. Fuel oil return

The following steps describe how the fuel oil returns:

Step	Action	
1	Fuel oil travels through the cylinder heads for injecting, cooling the fire deck, cleaning and lubricating the fuel injectors; 80% of the	
	fuel flow returns back to the tank.	



Step	Action From the heads the fuel flow enters a manifold where the split flow is brought back together and flows through the fuel cooler. Fuel cools below 90F (32C) to prevent a loss of power due to heat buildup.	
2		
3	On the output side of the fuel cooler there is a restricted orifice. The orifice provides constant back pressure on the system.	
4	The flow continues through a check valve and back to tank.	

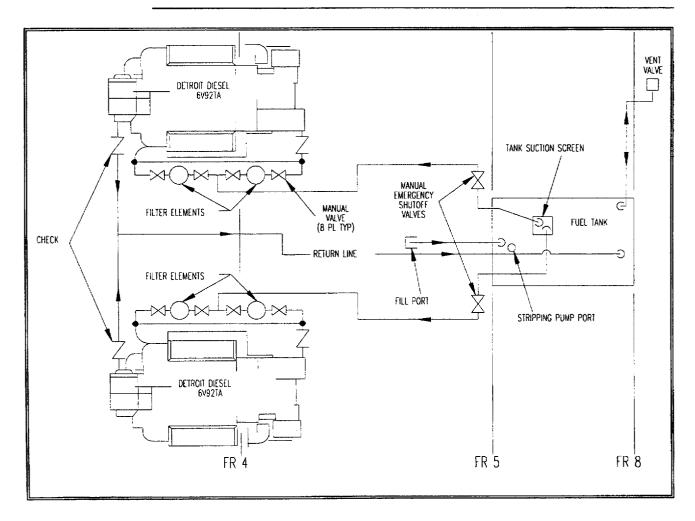


Figure 3-5 Fuel System



Section F. Hydraulic Steering System

F.1. General

The 47'MLB uses a manual servo steering system that interacts with a power assist system. The steering systems (figure 3-6) use Tellus T-15 hydraulic fluid. The manual system serves as the boat's emergency steering, if the manual system fails, the boat can be steered using engines. Though interconnected, for ease of understanding, the systems will be discussed individually.

MANUAL + POWER ASSISTED

F.2. Manual system operation

A helm unit (axial piston pump) on the open starboard steering station displaces 2.0 cubic inches of fluid per revolution. As the wheel is turned it pumps fluid from one side of the servo ram to the other. The steering fluid reservoir assembly in the engine room provides makeup oil and is closed to the atmosphere. Proper system operation requires an air head of 20 to 30 psi in the reservoir. A gauge at the reservoir displays pressure. The manual steering operates as a standard hydraulic system by supplying oil to either side of servo cylinder assembly in the lazarette. By responding directly to helm movement the connected rudders move with little effort on the steering wheel. When the jog levers are used, an electronic signal is sent to the control which pumps fluid to the appropriate side of the servo ram. When energized, the auto-pilot system sends signals to the auto-pilot pump to control the operation of the servo ram.

F.3. Power assisted system operation

The power assist system operates in direct response to the manual steering system to give very high response steering with minimal effort. Two hydraulic pumps driven by the engines provides fluid flow in the power assist system. Fluid flows from the pump to the pump relief/flow control valve that controls system pressure including the manual wheel steering circuit. In operation, pressure is only developed in the power circuit to bring about changes in rudder position. Under steady conditions, the power pumps circulate oil freely in the power circuit. The fluid enters the appropriate side of the port and starboard power cylinder in the servo/power cylinder unit in the lazarette. The servo cylinder commands the power cylinder to follow its movement and thus operate in direct response to helm movement. Another important function of this control assembly is that it provides automatic return to manual wheel steering if the power pump flow is lost or interrupted.



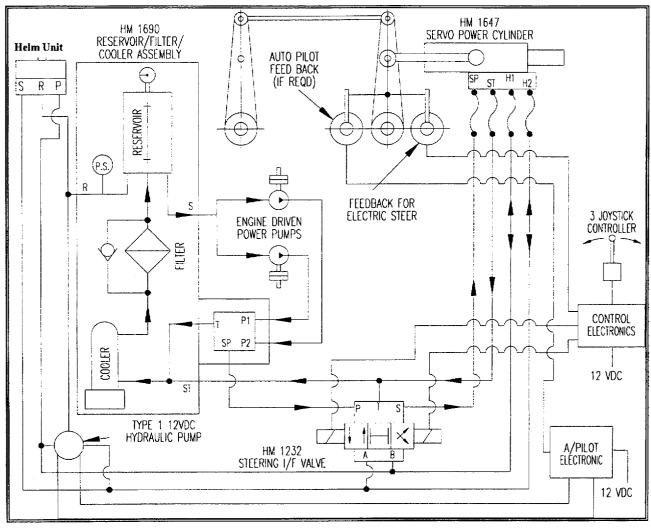


Figure 3-6 Steering System

F.4. System reservoir

The hydraulic steering system has reservoir assembly mounted on the starboard shell plating between frame 2 and 3. It performs the following functions for the system:

- 1. Supplies oil for the two-engine drive power pumps.
- 2. A supply of filtered oil for both the helm unit and the auto-pilot pump assembly.
- 3. Cooling (from the raw water system) to keep the system operating within operating parameters.
- 4. Continuous filtering of oil in the power assist circuit.



Section G. Heating, Ventilation, Air Conditioning System (HVAC)

G.1. General

The HVAC system heats, cools, and ventilates the survivors' compartment and the enclosed steering station. The system consists of two self-contained units located in the enclosed steering station and the survivors' compartment. Each unit can provide heating or cooling.

G.2. Control units

The control unit for the enclosed bridge HVAC system is located on the starboard bulkhead of the enclosed bridge. The control unit for the Survivors' Compartment is located just inboard of the ladder leading to the aft deck. The control units allow both manual and programmable control of heating and cooling within the two compartments.

NOTE &

If power is removed from the compressor units, wait five minutes before restarting the system.

G.3. Raw water system

The HVAC system is cooled by a raw water system. The intake and valve for the HVAC raw water system is located to starboard of the keel in the auxiliary machinery space. Two electrically powered raw water pumps pump water through piping to the HVAC compressors in the enclosed bridge and survivors' compartment.

Chapter 3 - Vessel Systems





Section H. Electrical System

H.1. General

The 47' MLB electrical system includes both AC and DC power distribution systems from several sources. The power panels for the system are shown in figures 3-7 through 3-9.

H.2. AC power sources

AC Power is provided from two separate sources.

Shore Power

The shore power receptacle located on forward weather deck deckhouse bulkhead. When connected to shore power, all circuits requiring AC power will operate.

While Underway

Two engine-driven AC, 5KW alternators provide the necessary AC power to the Sea Power units for the HVAC systems. Each alternator controller regulate AC power at 120V, 60Hz.

H.3. DC power sources

DC power is supplied to the 47' MLB by two engine-driven, 220-amp alternators and two banks of gel-cell batteries. This power is distributed through 24-volt DC and 12-volt DC power panels mounted in the auxiliary machinery space.

H.3.a. Batteries

The batteries installed on the 47' MLB consist of two banks of 12-volt gel-cell batteries mounted in a drip proof laminated fiberglass box with a vented top to prevent accumulation of charging gasses. Each bank consists of two 12-volt gel-cell batteries connected in series to provide 24 volts terminal voltage. A disconnect (cutout) switch panel mounted on port side of bulkhead 8 in the survivors' compartment permits each battery bank to be disconnected from its intended starting or service load. Under normal conditions, the battery banks operate independently. However, in the event that the engine starter can not provide enough current to start the engines, the two banks can be paralleled by closing the parallel switch located on the disconnect switch panel. Battery charging is performed in port by an AC powered battery charger in the auxiliary machinery space. Underway, two engine-driven alternators generate DC power.



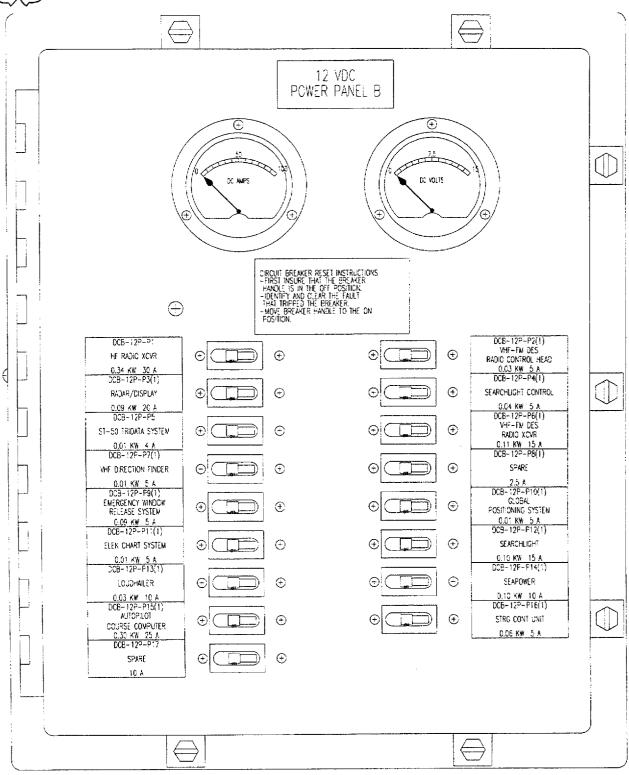


Figure 3-7 12 VDC Power Panel



H.4. Power panels

Three power panels are installed in the auxiliary machinery space.

- 1. 120 VAC
- 2. 12-volt
- 3. 24-volt

H.4.a. 120 VAC power panel

The 120 VAC power panel is on bulkhead 8 to port of the watertight door. This panel houses breakers for the battery charger (40 AMP), two receptacles (15 AMP each) with ground fault protection, HVAC units (40 AMP each) and engine hot starts (30 AMP each). A separate shore power main circuit breaker panel is mounted on the port shell plating at frame 9.

WARNING *

When Seapower AC alternator power is being used, the voltmeter and amp meter on the 120 VAC Power Panel will read zero but, in fact, power is present at the HVAC circuit breakers. Indication of power is on the Seapower remote status panel.

H.4.b. 12-Volt power panel

The 12-volt power panel is on bulkhead 10 outboard of the 24-volt panel. This panel receives its power from the converters mounted on the starboard side of the 24-volt power panel.

NOTE &

If the 12-volt power supplies trip off line, secure the electronics and allow power supplies to cool. The temperature of the auxiliary machinery space may get hot enough to prevent heat from the converters to dissipate. A thermo-switch will secure the units when overheated. Visually check the breaker to see if it has tripped. The possibility also exists that one unit is inoperative and the other is carrying the load, which will overload the functioning unit.

H.4.c. 24-Volt power panel

The 24-volt power panel is on bulkhead 10 to port of the watertight door. This panel houses all 24-volt electrical service breakers for the boat. A voltage meter and amperage meter are installed at the top of the panel face.

CAUTION!

Secure the service batteries when securing the start system cutout switch or when removing power cables from the starter. A 24-volt potential exists on the negative cable due to the common ground of the two systems.



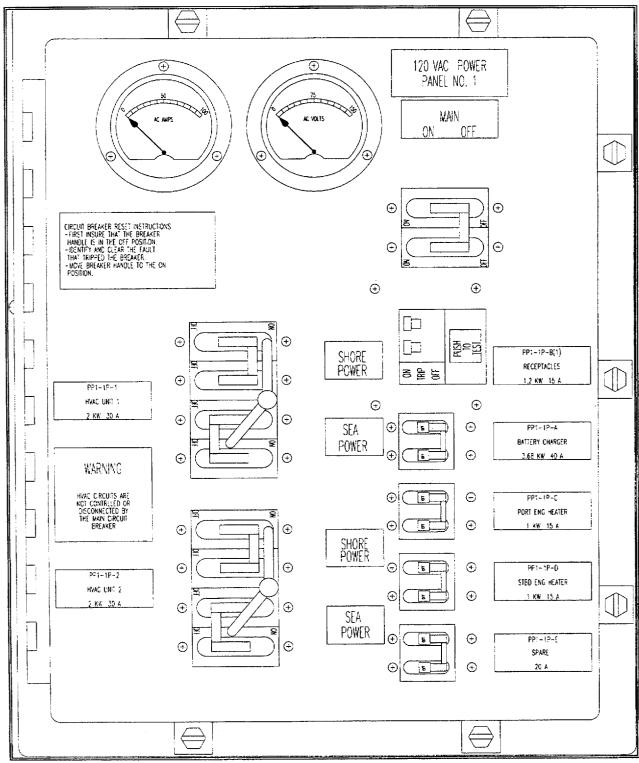


Figure 3-8 120 VAC Power Panel



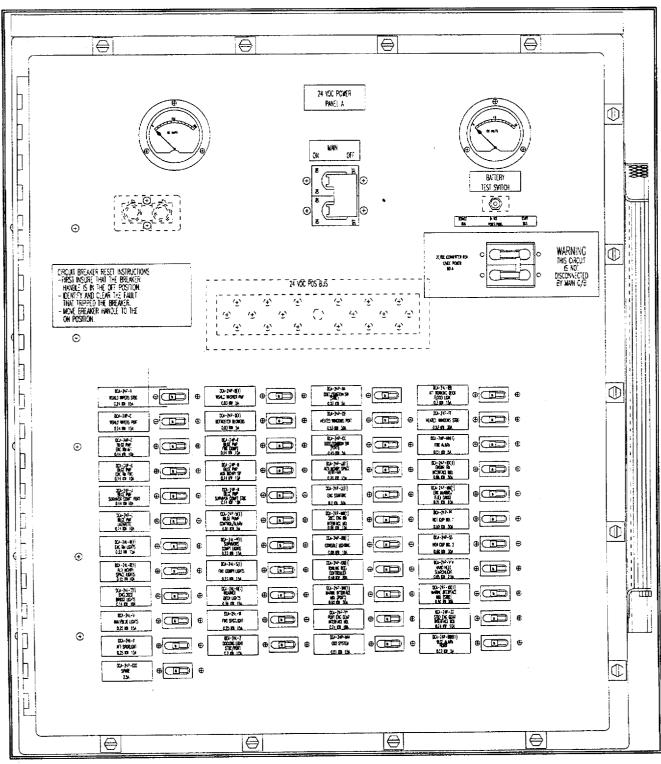


Figure 3-9 24 VDC Power Panel

Chapter 3 - Vessel Systems





Section I. Emergency Systems

Introduction

This section describes emergency systems and actions to be taken if a casualty to the boat or one of the boat's systems occurs.

The best casualty control action is to prevent casualties through good maintenance and proper seamanship. If a casualty does occur, there must be timely execution of a predetermined plan of action to correct and/or prevent worsening of the situation. Frequent underway casualty control drills both prepare and improve the crew's response.

In this section

This section contains the following information.

Торіс	See Page
Emergency Window Release System (EWRS)	3-34
Engine Room Fire Suppression System	3-36
Installed Dewatering System	3-38
Bilge Flooding Alarm System	3-40
Firefighting	3-41



Emergency Window Release System

I.1. General

In the case of damage to the pilothouse during a rollover, the Emergency Window Release System (EWRS) (figure 3-10) provides for automatic or manual opening of the port and starboard aft corner windows on the enclosed bridge. Sensors that are mounted on the port and starboard bulkheads near the overhead trigger automatic opening. When triggered, the EWRS provides for free transfer of water trapped in the enclosed bridge, which may affect stability.

I.2. System configuration

The EWRS windows are mounted on spring loaded hinges and are held closed and locked down by a sliding lock assembly. A EWRS air compressor and reservoir assembly mounted in the auxiliary machinery space provides charge air to the release system. A backup CO₂ actuator is mounted on the overhead at the centerline in the enclosed bridge. Upon activation by the automatic sensors or the manual actuator, the charge system slides the locking bolt open that releases the spring-loaded windows

I.3. Testing

The release system can be tested periodically by pressing the EWRS release test switch mounted just forward of the starboard window.

I.4. Re-arming

The system can be re-armed by resetting the test switch, pressing the reset button next to each window, closing the windows and securing the slide locks.



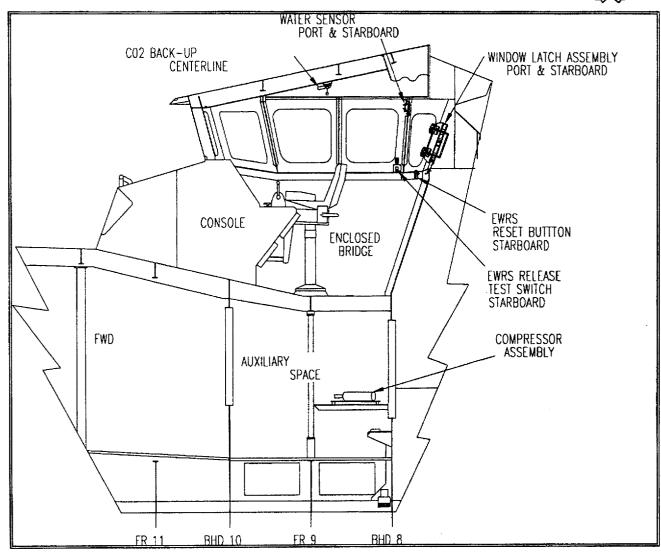


Figure 3-10
Emergency Window Release System



Engine Room Fire Suppression System

I. 5. General

The CO₂ fire suppression system (figure 3-11) is used for fire fighting in the engine room only. The system is only to be used in emergency situations to control a fire in the engine room space. All personnel must be evacuated from the compartment and all watertight doors sealed prior to activation of the system. Refer to the "Fire in the Engine Room" casualty control section in this manual for detailed procedures on system use.

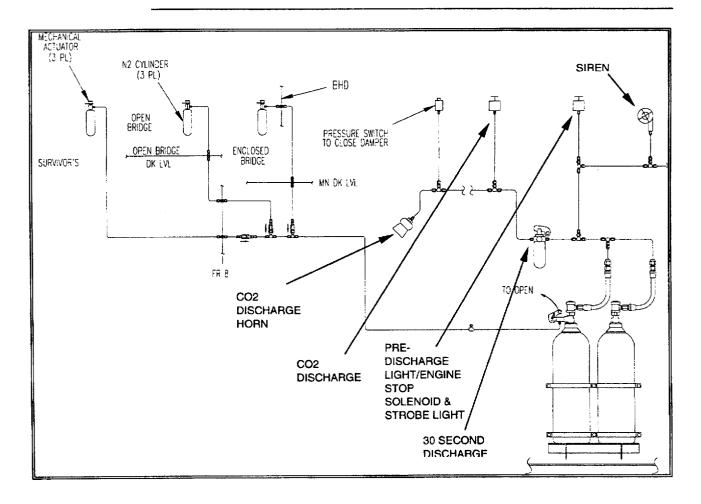


Figure 3-11
Engine Room Fire Suppression System



I.6. Storage location

The primary CO₂ firefighting agent is stored in two bottles mounted in the auxiliary machinery compartment to starboard of the watertight door on bulkhead 10.

I.7. Activation

The CO₂ system can be activated from four locations on the 47' MLB. Three actuators (located on the open bridge, enclosed bridge and survivors' compartment) puncture a nitrogen cylinder, which charges the activation piping. This activation system releases a pressure switch on the control head of the CO₂ storage containers. A fourth way to activate the system is by removing the locking pin and manually rotating the activation lever on the CO₂ bottle control head.

I.8. System flow Once the CO_2 has been released, the following event takes place:

Step	Action	
1	The discharge manifold lines are charged to a pressure operated siren and a pressure switch which energizes the pre-discharge warning strobe light, the engine stop solenoids, and the red "CO ₂ Pre-discharge" light located on the CO ₂ system indicator panel in the survivors' compartment. A separate line sends CO ₂ to a warning siren in the engine room.	
2	Along a separate discharge line, it activates the discharge time delay cylinder mounted on the aft starboard bulkhead of the survivors' compartment.	
3	The discharge delay cylinder delays release of CO ₂ into the engine room compartment for 30 seconds. This delay allows time for the siren and strobe to warn personnel to evacuate the compartment. If all personnel are accounted for, or for manual activation in the event of malfunction, the delay may be overridden by rotating the manual control lever on the discharge delay cylinder.	
4	Once the discharge delay cylinder is tripped, CO ₂ will be released into the compartment. In addition, the discharged CO ₂ will pressure trip the engine room air damper and the red "CO ₂ Discharged" light located on the CO ₂ system indicator panel.	



Installed Dewatering System

I.9. General

The 47' MLB is outfitted with seven 33 GPM submersible bilge pumps. Each bilge pump discharge line is fitted with an in line check valve mounted in a horizontal position. The discharge hose is attached to a through-hull fitting with two hose clamps. A sensor switch is used to automatically energize the bilge pump at a set water level. The level switch is above the height of the bilge pump to avoid discharging oil floating on the bilge water. The alarm circuit is connected to the boat horn on the mast platform. This alerts the crew whether moored or underway.

NOTE &

The installed bilge pump system is an EMERGENCY system only. It is not intended for general cleanup use.

I.10. Bilge pump selector switch

The bilge pump selector switch may be placed in manual, off, and automatic. The selector switch will normally be placed in the automatic position at all times.

CAUTION!

To place a bilge pump selector switch in manual position may result in a discharge of oil.

NOTE &

It will require approximately 10" of water in a bilge space to activate the bilge pumps when set in the automatic mode.

I.11. Location of pumps and panel

The locations of each bilge pump and a schematic are provided in Figure 3-12. A control panel is in the enclosed steering station on bulkhead 8 to starboard of the aft facing window.

I.12. P5 portable pump

A separate method of emergency dewatering of the engine room is available through use of the P5 portable pump connected to the dewatering standpipe (figure 3-13) mounted on the aft buoyancy chamber. This standpipe takes suction from the engine room bilge.



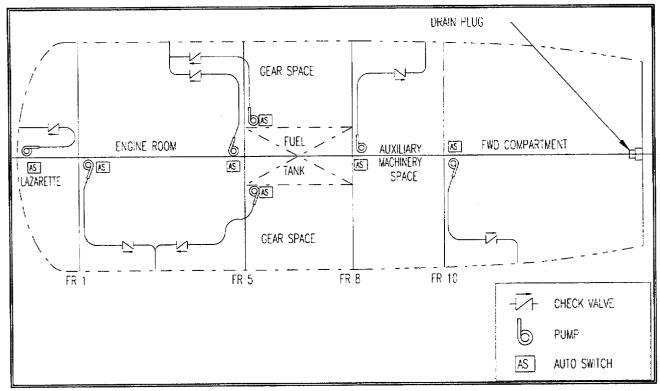


Figure 3-12 Bilge Pump System

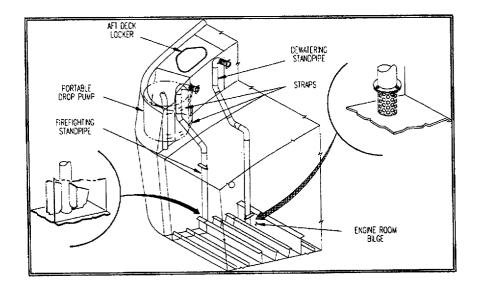


Figure 3-13
Dewatering & Fire Fighting Standpipes



Bilge Flooding Alarm System

1.13. Sensors

The 47' MLB is out fitted with seven bilge flooding alarm sensors located near each 33 GPM submersible bilge pumps. The sensors are mounted approximately 5" below the bilge pump activation sensors and will activate the MLB's alarm prior to activation of the bilge pumps.

I.14. Operation

The alarm system operates independently from the installed dewatering system; it serves only to alert the crew of bilge flooding. Continuous sounding of the MLB's horn and a beeping on the alarm panel will indicate flooding. Pushing the silence button on the alarm panel may silence both.

I.15. Location

The alarm panel is located in the enclosed steering station on Bulkhead 8 starboard side above the bilge pump control panel. A light on the panel indicates power to the system.

I.16. Spaces

The sensors distributed to provide flooding alert to five bilge spaces:

- Forward Compartment
- Auxiliary Machinery Space
- Gear Space
- Engine Room
- Lazarette

A light on the panel will indicate the space or spaces where bilge flooding has occurred.



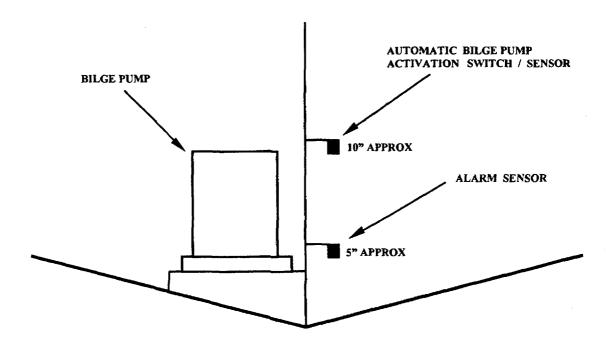


Figure 3-14 Bilge Flooding Alarm System



Firefighting

I.17. Policy

Fire fighting is not a primary mission of the 47'MLB. Because of its limited capability, all fire fighting activities should be limited to only those in accordance with Section 3.D. of the CG Addendum to the National SAR Manual.



Chapter 4 Crew Requirements

Overview

Introduction

The Boat Crew Training Manual, COMDTINST M16114.9 (series), provides minimum standards and guidelines for competence on board the 47' MLB. Each crewmember should be familiar with the duties of the other crewmembers in addition to his or her own duties. It is important for a crewmember to know and commit to memory all-important characteristics of the boat and its equipment, and which procedures to follow in the event of a casualty. Each crewmember should mentally rehearse the procedures each member of the crew would follow during any operational casualty. Teamwork is the common thread that allows the crew to succeed. Whenever the opportunity is available, the crew should get the boat underway to practice operational and emergency procedures.

In this chapter

This chapter contains sections.

Section	Topic	See Page
A	Minimum Crew	4-3
В	Coxswain	4-5
С	Engineer	4-7
D	Crew Members	4-9
E	Passengers and Survivors	4-11
F	Training	4-13
G	Safety Equipment	4-15

Operators Manual - 47'MLB





Section A. Minimum Crew

A.1. General

The minimum number of crewmembers for the 47' MLB is four, of which three must be qualified and certified.

A.2. Qualified/ certified crewmembers

The qualified/certified individuals must include at least one coxswain and one engineer. The third qualified/certified individual crewmember may be an additional coxswain/engineer or a crewmember.

A.3. Nonqualified/ certified crewmember

If the fourth member of the crew is not qualified and certified at any position, at a minimum they must have completed all of the division one and two PQS tasks of COMDTINST M16114.10, Boat Crew Qualification Guide, Volume I, Boat Crewman.

A.4. Additional crewmembers

The nature of the response, local requirements, missions assigned, and special operations will dictate the need for additional qualified and certified crew members. For example, an additional qualified crewmember acting as safety observer during helicopter operations is preferred. Whenever appropriate, additional qualified and certified crew should be assigned to missions involving emergency situations.

Chapter 4 - Crew Requirements





Section B. Coxswain

B.1. General

The Coast Guard places great trust in each coxswain and his or her ability to accomplish the assigned missions in a safe and professional manner even under adverse conditions. The position of coxswain is one of high regard and great responsibility.

The coxswain is responsible for the boat and its crew during every mission. The coxswain assigns and directs all on board functions during each operation.

B.2. Authority and responsibility

The extent of the authority and responsibility of the coxswain is specified in COMDTINST M5000.3, USCG Regulations as follows:

"The coxswain shall be responsible, in order of precedence, for the safety and conduct of passengers and crew; the safe operation and navigation of the boat assigned; and the completion of the sortie or mission(s) assigned or undertaken pursuant to USCG policy and regulations. An underway coxswain will at all times respond, within the limits of capabilities and legal authority to observed hazards to life or property, and violations of law or regulations."

The coxswain is the direct representative of the Commanding Officer or Officer-in-Charge and as such, (subject to Articles 88-89 of the UCMJ) has the authority and responsibilities that are independent of rank or seniority in relation to other personnel embarked. The authority and responsibility of the coxswain exist only when the boat is engaged on a specific sortie or mission.

B.3. Relief of responsibility

The only person embarked in the boat who may relieve the coxswain of the responsibility as described above is:

- a. The Commanding Officer, Officer-in-Charge, Executive Officer, or Executive Petty Officer.
- A senior officer at the scene of a distress emergency, or other abnormal situation who exercises authority under the provisions of USCG Regulations, whether or not other units are involved.



B.4. Operating in heavy weather

Operating in surf, heavy weather, or breaking bar/inlet conditions without an experienced coxswain can seriously jeopardize the safety of the boat, its crew and the mission. The coxswain must consider many factors when operating in heavy weather or surf. These factors include case severity, experience of the crew, period and type of breaking waves, water and air temperature, and forecast weather outlook. The above describes the principal roles and knowledge required of the Surfman, which is an advanced coxswain certification.

NOTE &

During all risk assessment decision making processes; crewmembers, coxswains, surfmen, unit commands and all elements exercising operational control over a boat shall consider individual boat capability, crew assignments, and the nature of distress when assigning response units when *heavy weather* conditions exist or are likely to be encountered. Heavy weather is determined to exist when seas exceed 8 feet or winds are greater than 30 knots.

NOTE &

Surf conditions exist when <u>breaking seas</u> exceed 8 feet and/or when, in the judgment of the Commanding Officer/Officer in Charge, rough bar/surf conditions exist and/or whenever there is doubt in the mind of the coxswain as to the present conditions. When rough bar/surf exists, a surfman shall be assigned as coxswain and all PPE will be worn unless specifically waived by the Commanding Officer/Officer in Charge.



Section C. Engineer

C.1. General

The position of boat engineer is one of great responsibility. The knowledge and skill of the engineer can make the difference in completing the mission under adverse conditions.

C.2. Qualifications

The boat engineer must be a certified crewmember prior to obtaining certification as a boat engineer since this individual is required to perform duties in both capacities.

C.3. Responsibilities

The primary responsibilities of this position include <u>operational</u> and <u>underway maintenance</u> of the propulsion and auxiliary systems.

The engineer may also serve as:

- · senior crew member,
- safety observer,
- boarding officer,
- line handler,
- · helmsman,
- surface swimmer,
- · emergency medical technician, or
- other such duties as may be assigned by the coxswain in support of operational and training sorties or missions.

Chapter 4 - Crew Requirements





Section D. Crew Members

D.1. General

Under direct supervision of the coxswain, the crew member is responsible for line handling, acting as lookout or helmsman, maintaining a towing watch and assisting the coxswain as required during all evolutions or maneuvers.

Chapter 4 - Crew Requirements





Section E. Passengers and Survivors

E.1. General

Qualification, certification and assignment as a crew member on a 47' MLB requires considerable time, effort, and practice. The individual must learn the characteristics of the boat and its missions, as well as the adverse conditions of the sea and the environment in which the boat operates. Each break-in crew member must take the time to study his or her duties in addition to the duties of the other crew members since it may be necessary to perform any given duty in the event of an emergency. The Boat Crew Qualification Guide, Volumes I-IV, COMDTINST M16114.10 provides the standards for qualification as coxswain, boat engineer, crewman and surfman aboard the MLB.

Since passengers and survivors may not have any vessel or equipment knowledge, it is important they receive a basic safety brief prior to getting underway or soon after coming aboard. They should be provided with adequate safety or personal protective equipment based on the mission or situation. At a minimum, each shall wear an appropriate personal flotation device (PFD). When riding alone or rescued from adverse conditions each person should be safely protected through use of boat crew safety belts or the installed seatbelts of the MLB seats.

Chapter 4 - Crew Requirements





Section F. Training

F.1. General

Qualification, certification and assignment as a crewmember on a 47' MLB requires considerable time, effort, and practice. The individual must learn the characteristics of the boat and its missions, as well as the adverse conditions of the sea and the environment in which the boat operates. Each break-in crewmember must take the time to study his or her duties in addition to the duties of the other crew members since it may be necessary to perform any given duty in the event of an emergency.

F.2. Standards for qualification

The Boat Crew Qualification Guide, Volumes I-IV, COMDTINST M16114.10 provides the standards for qualification as coxswain, boat engineer, crewman and surfman aboard the 47'MLB.

F.3. Training underway

Where staffing permits, additional personnel may ride the boat in a training capacity to enhance their familiarity with the boat. To become and remain proficient as a crewmember on this or any boat an individual must get underway and practice his or her skills repeatedly.

Chapter 4 - Crew Requirements





Section G. Safety Equipment

G.1. Personal protective equipment

During all 47' MLB operations, crewmembers shall wear personal protective equipment as required by COMDTINST M10470.10C, Coast Guard Rescue and Survival Systems Manual.

NOTE &

The coxswain is responsible for ensuring that all required personal safety equipment is worn, and worn correctly.

G.2. Protective equipment during heavy weather

The following equipment shall be worn during all heavy weather operations unless waived by the Commanding Officer/ Officer in Charge or by the coxswain if he/she has been specifically delegated waiver authority by the Commanding Officer/Officer in Charge:

- appropriate underclothing;
- waterproof footwear and gloves; and
- goggles. Goggles may be necessary for visibility, particularly for persons wearing glasses. Goggles will also protect against glass shards should a window break.

G.3. Protective equipment in surf

When operating in surf conditions, crewmembers shall wear the following equipment as specified in COMDTINST M10470.10C, Rescue and Survival Systems Manual unless specifically waived by the Commanding Officer/Officer in Charge:

- Hypothermia protective clothing
- Safety Helmet. Helmet straps must be secured and adjusted properly.
- Safety Belt. Belt must be adjusted correctly and secured to appropriate safety D-Rings. When seated in a seat, the safety belt for the seat must be worn in addition to the personal safety belt.

4-16



Chapter 5 Operational Guidelines

Overview

Introduction

This chapter describes how to use the 47' MLB in the safest and most efficient manner. These policies and performance criteria should be used to as guidelines for MLB operations. Within these guidelines, consider local operating conditions, district regulations and the skill of the crew to determine how the MLBs capability is to be used. These factors must be considered prior to each sortie or mission.

In this chapter

This chapter contains sections.

Section	Topic	See Page
Α	Operating Limits	5-3
В	Performance Data	5-9

Operators Manual - 47'MLB





Section A. Operating Parameters

A.1. General

The readiness of the 47' MLB shall be continuously monitored to insure that it is capable of unrestricted operations. This monitoring is accomplished through a variety of programs, including daily boat checks, the boat PMS schedule, annual engineering inspection, annual Ready for Operations (RFO) evaluations, and biennial Standardization Team Visits.

For the purpose of this section, Operational Commanders are defined as commanders of Groups, Activities, Air Stations, Districts and Greater Antilles Section, who exercise direct operational control of a subordinate unit with a standard boat. See Chapter 1, Coast Guard Boat Readiness and Standardization Program Manual, COMDTINST M16114.24A.

Operating parameters for the MLB and crewmembers include the following areas.

A.2. Disabling casualties

Disabling casualties are those which make the boat not serviceable. Appendix D contains a listing of disabling casualties. If a disabling casualty is identified when the boat is moored, the boat shall not get underway until the casualty is corrected.

NOTE &

The Operational Commander may authorize, in writing, the movement of the boat (for short distances) under its own power only to facilitate haul-outs or corrective maintenance. In the event that the boat sustains a disabling casualty while underway, the boat shall immediately return to the nearest safe mooring, if able. In many cases the boat will require assistance from another vessel.

Disabling casualties shall be reported immediately to the Operational Commander by the most expeditious means; followed by a boat status message as soon as possible but no later than 12 hours after the casualty is discovered. The boat shall be immediately placed in Charlie status and repaired. If the casualties cannot be repaired within 48 hours, a CASREP shall be sent within 24 hours of the casualty.

A.3. Restrictive discrepancies

Restrictive discrepancies are those which restrict the operations of the boat such that it can perform some missions, but not all missions safely. Appendix E contains a listing of restrictive discrepancies.



A.3.a. Reporting restrictive discrepancies

Restrictive discrepancies shall be reported to the Operational Commander if the discrepancy cannot be repaired within 1 hour. The boat shall be immediately placed in a Charlie status and shall not get underway until the discrepancy is corrected, or a waiver has been received. If the discrepancy cannot be repaired within 48 hours, a CASREP shall be sent within 24 hours of the discrepancy. The Operational Commanders is responsible for monitoring the progress of repairs to these discrepancies.

A.3.b. Waivers

Boats with restrictive discrepancies shall only be operated if a written waiver has been issued by the Operational Commander. The waiver shall:

- 1. list the discrepancy,
- 2. describe the conditions under which the boat may be operated, and
- 3. concurrence on the measures to be taken to lessen or negate the hazard posed by the discrepancy.

A verbal waiver is authorized, as long as a written waiver follows it up within 4 hours.

A.3.c. Discrepancy underway

In the event the boat sustains a restrictive discrepancy while underway, the Coxswain should not normally proceed without authorization, unless aborting the mission would increase the level of risk to the person(s) or vessel being assisted. The situation and recommendations must be effectively communicated to the Operational Commander to allow for prudent risk assessment by all levels.

The reporting procedure is as follows:

Step	Procedure
1	The coxswain shall immediately notify the parent unit with all pertinent information and a recommendation as to whether to continue or abort the mission.
2	The parent unit shall pass along the information pertaining to the casualty, the current mission, and recommendations to the Operational Commander.
3	The <u>Operational Commander</u> shall immediately notify the unit as to whether or not continuing the mission is authorized, and the conditions under which the boat may be operated.



A.4. Major discrepancies

Major discrepancies are those that degrade the effectiveness of the boat to perform one or more missions. Appendix E contains a listing of major discrepancies. The occurrence of major discrepancies shall be documented. A plan to correct these discrepancies shall be formulated and carried out. The Operational Commander is responsible for monitoring the status of repairs to these discrepancies.

A.5. Minor discrepancies

Minor discrepancies do not affect the operational readiness of the boat. However, a boat with minor discrepancies does not meet the standardization criteria established for the boat. The occurrence and repair of minor discrepancies shall be documented and monitored at the Station/Unit level.

In the event that the addition of portable equipment, not part of the standard boat outfit, is necessary to meet mission needs; units are authorized to temporarily carry this extra equipment. This authorization is on case by case basis only, and care must be taken to properly secure any extra gear and to ensure it does not interfere with safe egress or the boat's standard outfit/systems. Under no circumstances shall permanent alterations be made to power, stow or in any way accommodate extra equipment.

A.6. Responsibilities

The Coxswain is always responsible for the safe operation of the boat. The coxswain must decide if the mission warrants subjecting the crew and boat to the danger defined by the mission, weather and sea conditions anticipated.

A.6.a. Disabling casualty - underway

In the event that the boat sustains a disabling casualty while underway, the boat shall immediately return to the nearest safe mooring, if able. In many cases the boat will require assistance from another vessel.

A.6.b. Restrictive discrepancy underway In the event the boat sustains a restrictive discrepancy while underway, the Coxswain should not normally proceed without authorization, unless aborting the mission would increase the level of risk to the person(s) or vessel being assisted. The situation and recommendations must be effectively communicated to the Operational Commander to allow for prudent risk assessment by all levels. The following is the procedure for communicating the discrepancy while underway:

Step Procedure	
1	The coxswain shall immediately notify the parent unit with all pertinent information and a recommendation as to whether to continue or abort the mission.



Step	Procedure		
2	The parent unit shall pass along the information pertaining to the casualty, the current mission, and recommendations to the Operational Commander.		
3	The <u>Operational Commander</u> shall immediately notify the unit as to whether or not continuing the mission is authorized, and the conditions under which the boat may be operated.		

Casualty/Discrepancy	Consequence	Required Action
Disabling Casualty "Boat is not serviceable"	Not authorized to get u/w.* Notify Operational Commander immediately by the most expeditious means, follow up by a boat status message.	Assign "Charlie" status to the boat, and commence repairs immediately. Submit CASREP if applicable.
Restrictive Discrepancy "Boat and crew cannot perform all missions safely."	Operations restricted. Notify Operational Commander if repairs cannot be made in 1 hour.	Create repair plan and set deadline for completion of repairs. Group/Operational Commander shall monitor progress of repairs. Any operations before restrictive discrepancies are repaired require written waiver (See A.3.b. above) from the Group/Operational Commander. Submit CASREP if applicable.
Major Discrepancy "Boat and crew can perform all missions but some degradation in effectiveness or readiness should be expected."	Operations unrestricted. Discrepancy occurrence, and repair is documented.	Maintenance plan is carried out, Group/Operational Commander shall monitor status of repairs to the discrepancies.
Minor Discrepancy "Boat and crew readiness not affected nor impaired. Boat does not meet standards."	Operations unrestricted. Discrepancy occurrence and repair is documented.	Maintenance plan is carried out. Station CO/OIC monitors completion of maintenance/repair.



A.7. Environmental limits

The 47'MLB is built to operate safely under heavy weather conditions within its design limits. With approval from the operational commander, crews may operate the boat in conditions that exceed the environmental limits; however, the coxswain is ultimately responsible and must always make the final determination whether the boat and crew can safely perform the mission.

- 1. 30'seas
- 2. 20'surf (breaking seas)
- 3. 50 knots sustained winds
- 4. 50 nautical miles offshore
- 5. 150 displacement tons tow load

NOTE &

These limits may be exceeded by approval of the group commander, ONLY after appropriate risk assessment for the situation at hand is made. On-scene conditions provided by the on-scene commander and MLB coxswain must be considered in the risk assessment process. The coxswain retains the final on-scene decision as to whether or not an action may be safely executed.

Chapter 5 - Operational Guidelines





Section B. Performance Data

B.1. Fuel consumption

Fuel consumption and operating range is affected by engine tuning, weather conditions, trim, type of evolution (towing, searching, etc.) and operating area (e.g. shallow water increases resistance, decreases range). Figure 5-1 shows typical fuel consumption at full load condition with no tow. Figure 5-2 shows the operating range of the 47'MLB at various speeds.

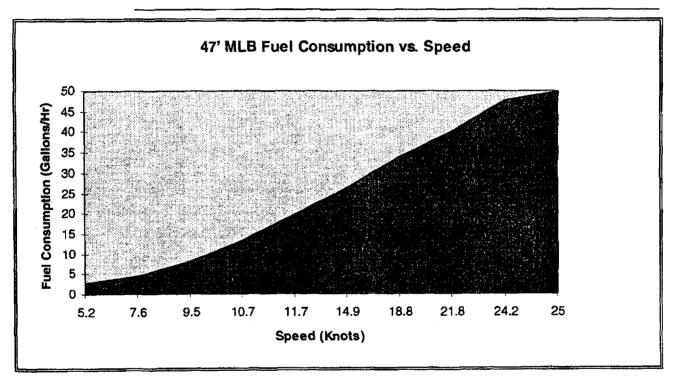


Figure 5-1
Fuel Consumption vs. Speed

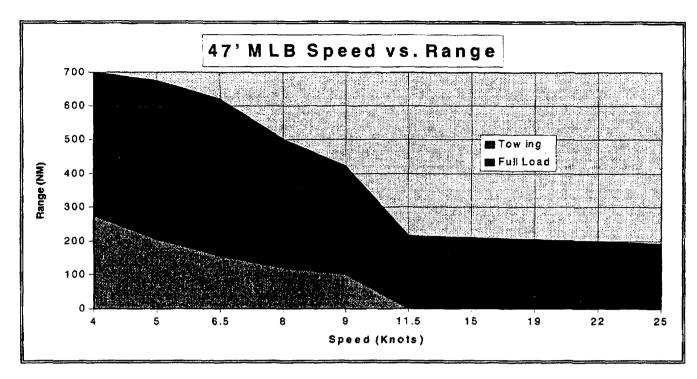


Figure 5-2 Range vs. Speed

B.2. Seakeeping

Figure 5-3 shows maximum safe operating speed of the boat as a function of sea height (head seas). Head seas operation is generally considered the slowest heading.

WARNING *

The coxswain is responsible for ensuring that all required personal safety equipment is worn, and worn correctly.

B.3. Turning

Turning radius is affected internally by the boat's speed, rudder angle, and hull design and externally by wind, current and wave action. Because of the hull design and inherently stable straight-line tracking of the 47' MLB, full speed/full rudder turns are not accomplished quickly in relation to the 44' MLB. See the "Handling Characteristics" section of this chapter for methods to plan effective turns. Figure 5-4 shows typical rudder-only turning performance.

B.4. Stability

The 47' MLBs righting arm (an indication of the vessel's tendency to return to upright) decreases between approximately 50 and 80 degrees of heel before it increases dramatically. This means that once the boat has been pushed past 50 degrees roll by a dynamic external force (wave), it may be likely to roll to at least 80 degrees. Beyond 80 degrees the 47' MLB's righting arm increases dramatically acting to right the vessel.



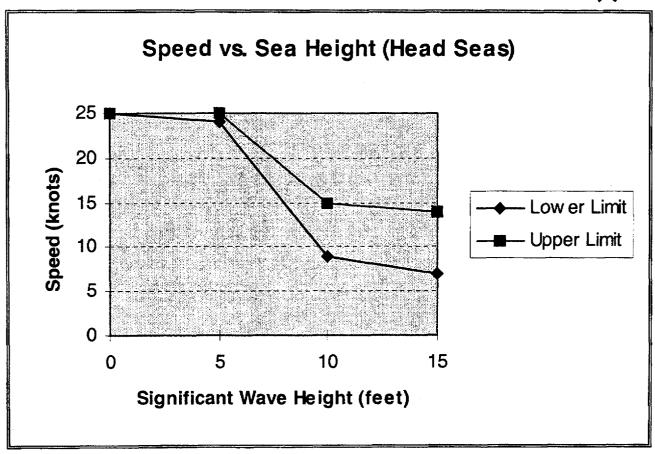


Figure 5-3 Speed vs. Sea Height

Initial Speed (knots)	Rudder Position (deg)	Time 90 deg (sec)	Time 180 deg (sec)	Time 360 deg (sec)	Tactical Diameter (yards)	Advance åt 90 deg (yards)	Transfer at 90 deg (yards)	Turn Speed (knots)
10	20	20	35	62	93	70	57	10
10	30	14	22	44	68	53	37	9
15	20	19	32	58	130	110	82	13
15	30	15	26	47	82	68	46	10
20	20	18	34	61	175	118	94	16
20	30	16	26	45	112	120	64	13
24	30	9	23	44	128	83	37	13

Figure 5-4
Turning Characteristics

B.5. Acceleration

The average minimum time for the MLB to accelerate to full speed is 40 seconds, covering a distance of 0.2 nautical miles.

NOTE &

Do not use rapid accelerations from dead-in-the-water (DIW) to full speed except when necessary. This conserves fuel and helps prolong engine life.

B.6. Speed

The boat idles at 5-6 knots and achieves 20 knots with a full load in sea state 2. Its maximum speed is dependent upon weather and sea conditions, hull condition and a variety of mechanical factors, but should reach 25 knots or greater with a full load in sea state 0. The boat's speed is deceiving. It moves faster than it appears. Do not focus solely on peripheral activities or other tasks that will take attention from boat operation.

NOTE &

Maximum speed/power should be used only when operationally necessary (e. g., transitioning a surf zone, responding to SAR case, maneuvering, etc.). Under non-urgent conditions, proceed at cruise speed of 20 knots/1850 RPMs or less.

B.7. Deceleration

CAUTION!

Use a "crash stop" only when absolutely necessary. Crash stops place significant strain on the propulsion system.

The design of the 47' MLB allows it to move swiftly through the water when up on plane. When power is taken off the boat, it will settle rapidly and stop relatively quickly. A coasting deceleration (from full speed to DIW) requires an average of one minute and ten seconds (covering a distance of approximately 400'). In an extreme situation, the boat can be stopped rapidly by reversing the throttles from full ahead to full astern. This "crash stop" deceleration (both throttles astern full) requires an average of nine seconds, covering a distance of approximately 150'. Deceleration can be done slightly faster than even a crash stop by using hard rudder in addition to astern propulsion.



Chapter 6 Mission Performance

Overview

Introduction

The actions and techniques described in this chapter are products of field experience. They are intended to give boat crewmembers information on how the 47' MLB performs and reacts in various mission scenarios. The information is not intended to provide the "only way" to perform an action or complete a mission. Boat crews should use effective communications and teamwork skills along with this general information to adapt their actions to each unique mission scenario.

Information in this section alone does not qualify a crewmember. Observe these procedures and apply skills developed through practice to effectively use the MLB to perform missions.

In this chapter

This chapter contains these sections.

Section	Торіс	See Page
A	Starting Procedures	6-3
В	Underway	6-7
C	Handling Characteristics	6-9
D	Surf Operations	6-17
E	Towing	6-19
F	Anchoring	6-21
G	Helicopter Operations	6-23
Н	Personnel Recovery	6-25
I	Ice Conditions	6-27
J	Securing Procedures	6-29

Operators Manual - 47'MLB





Section A. Starting Procedures

A.1. Pre-start

The following procedures must be followed before starting a cold engine, and should be repeated before each mission.

	snould be	e repeated before each mission.		
	Step	Action		
	1	Inspect bilges for excessive amounts of water. Look for signs of spilled fuel or oils. Pump and clean as necessary		
	2	Sound fuel oil tank. Ensure fuel oil is maintained at 95% (373 gallons). Fuel sounding tube is on the aft deck, port side forward.		
NOTE &	3	Check the following fluid levels:		
Reduction gear oil will be above the "H" mark reduction gear is not tu. The reduction gear oil be checked again with running at low idle. At the level must be between	when the rning. level must the engine low idle,	 Engine oil level filled to "FULL" mark. Reduction gear oil filled at least to "FULL" mark Engine coolant sight glass filled to half mark of coolant recovery bottle. NOTE &		
and the "H" marks on t dipstick.		Coolant level must be rechecked after the engine warms up and when the boat stops to take on fuel.		
	4	Ensure air intake is clear and machinery space ventilation flapper is open.		
	5	Open sea suction valves and check sea strainers for cleanliness. Ensure sea strainer handle is selected to one side.		
	6	Ensure HVAC system raw water cooling valve is open.		
-	7	Ensure fuel supply valves are open to fuel tank.		
	8	Check all belts for proper tension.		
	9	Secure dockside electrical power and disconnect shore-tie from the boat. Secure all breakers in the 120-volt AC power panel.		
	10	Ensure the main breaker and the following breakers on the 24-volt DC power panel are on: DDEC/Ignition Switch (Port) DDEC/Ignition Switch (Stbd) Engine Room Interface Module Engine Starting Engine Alarms/Fuel Gauge Marine Interface Module (Port)		



Step	Action	
	Marine Interface Module (Stbd)	
	Engine Gear Interface (Port)	
	Engine Gear Interface (Stbd)	
	CO2 System	
	Bilge Alarm Horn	
	Bilge Pump Control Alarm	
	Auxiliary Machinery Space Lights	
	Engine Room Lights	
	Forward Compartment Lights	
	Enclosed Bridge Lights	
	Console Lights	

A.2. Engine starting

The following procedures must be followed for starting the engines.

	Step	Action		
	1	Set throttle levers to neutral position at all operating stations.		
	2	Close the "ENGINE START" switches on the overhead console of the enclosed bridge. The Electronic Display Module (EDM) should illuminate and sound a brief audible alarm while running system and wiring checks. A display of current engine status follows.		
1	3	Depress and hold the "ENGINE START" button on the enclosed bridge console until the engine is started. The engine will idle at ~750 RPMs until the oil temperature reaches 112 degrees.		
	4	Repeat the previous two steps for the second engine.		
	5	Ensure raw water flow through the engines by observing overboard discharge.		
	6	Visually check the gauges in the engine room for proper operation and operating ranges.		
If proper oil pressure is not evident, immediately secure engine and investigate.				

If the start system batteries will not crank over the engines, energize the battery parallel switch.

NOTE &

CAUTION!



equipment

A.3. Energizing Complete the following steps prior to getting underway.

	Step	Action
	1	Close (turn on) all of the remaining breakers on the 24-volt DC and 12-volt DC power panels.
	2	Energize and test all installed electronic components.
	3	Conduct a test on all jog levers and the steering wheel. Ensure stop to stop movement on the rudder angle indicator.
When engines have warmed up (the RPMs) and with the throttle levers in ACTIVE" button on throttle control activates the system control for that "STATION ACTIVE" light should in		When engines have warmed up (they will have slowed to ~600 RPMs) and with the throttle levers in neutral, press the "STATION ACTIVE" button on throttle control panel and release. This activates the system control for that helm position. The red "STATION ACTIVE" light should illuminate. The EDM should also display which station has control.
	5	Test throttle operation in forward and reverse.
	6	Momentarily depress the "STATION ACTIVE" again to deactivate that station's control.
d	NOTE	Depressing and holding the "STATION ACTIVE" button for more than one second disables all control stations; gearboxes return to neutral and engines return to idle. To regain control, place the throttle levers in the neutral position and momentarily depress the "STATION ACTIVE" button again.
_	7	Repeat steps 4 through 6 at each helm control station.
	8	Ensure gear is properly stowed and watertight integrity is set.
	9	Inform coxswain on the status of all engineering and electronic systems and if the boat is ready to get underway.

NOTE ↔

The "STATION ACTIVE" light will flash during station transfer if the throttle position at the new station is not matched to the old station.

Chapter 6 - Mission Performance





Section B. Underway

B.1. General

After getting underway, observe all appropriate machinery gauges. If an abnormal condition develops, take corrective action to prevent further damage. Refer to the Casualty Control section of this book, the Boat Engineer Qualification Guide, COMDTINST M16114.6 (series), or the appropriate manufacturer's technical publication.

B.2. Personal protective gear

Always observe requirements of this manual, the Boat Crew Seamanship Manual (COMDTINST M16114.5 Series) and the Rescue and Survival Systems Manual (COMDTINST M10470.10 Series) for wearing protective clothing, personal flotation devices and boat crew signal kits. Personal protective gear is especially important when operating the boat from the open steering station in cold and wet weather.

B.3. Communication

Crew communications and coordination is the key to safe operations. Crewmembers should inform the coxswain of their location when moving about the deck. Engine noise can make crew communications difficult on the 47' MLB; speak loudly and clearly repeating as necessary until acknowledged.

NOTE &

When operating in the surf conditions, effective crew communications are critical. Speak loud enough to be heard over the background noise. Ensure the receiver hears and understands the message being passed. A common strategy is to have the receiver repeat back the message that was sent.

NOTE &

The enclosed steering station can create a sense of isolation from the elements and other marine traffic. Crewmembers should use all available means to maintain awareness of wave action, winds, currents and traffic.

B.4. Changing control stations

The following are the steps necessary to change control stations aboard the 47' MLB.

Step	Action
1	Proceed to the new control station and press the <i>helm</i> activate button to take control of steering from that station.
2	Once steering is positively gained and you are ready to transfer throttle control to the new station, match the throttle levers of the new station to the forward or reverse detent clutch position of the currently active station. Do not position the levers above the idle speed position.



Step	Action
3	Press the "Station Active" button at the new control station. The red LED light for that station will begin to flash.
Active" bu	five seconds to complete the procedure once you press the "Station atton. If you don't complete the procedure in the allotted time, the all begin to slowly drop in RPM to alert you to complete the throttle ne new station.
4	Move the throttles out of the detent position to the engine speed of the previous station. Once you match or pass the previous setting
	you have assumed control.

NOTE &

CAUTION!

6-8



Section C. Handling Characteristics

Introduction

Boat handling is a complex skill that requires extensive knowledge and practical underway experience to build confidence and skill levels. Properly handling a 47' MLB requires forethought and finesse. Always know the boat's handling features, monitor the prevailing weather conditions and take into account the vessel's limiting factors.

In this section

This section contains the following information.

Торіс	See Page
Turning and Pivoting	6-10
Head Seas	6-12
Stern to Seas	6-13
Beam Seas	6-14
Effects of Wind	6-15
Station Keeping	6-16



Turning and Pivoting

C.1. General

There is a momentary (1½-2½ second delay) in response when inputting DDEC throttle commands. The MLB turns or pivots, for steering purposes, on its vertical axis at approximately the windscreen. Since the 47' MLB has a large superstructure and deep-V hull, it turns relatively slowly especially in strong winds. Because of this design characteristic (which provides other benefits such as straight-line tracking and planing), coxswains must be aware of the boat's turning characteristics.

C.2. Jog levers

NOTE &

The jog levers may be used for any boat evolution, but be aware that they do not provide backup manual steering as does the helm. The boat can be steered using the helm or jog levers for rudder commands, by engines or by the use of environmental factors (wind, current or waves). The jog levers provide a very responsive method of steering. The angle at which the operator moves the jog lever side to side corresponds to the angle at which the rudder will be. Upon releasing the jog lever it will return to the straight up position and the rudder will return to amidships. Placing a forearm on the chair armrest with the jog lever between middle finger and ring finger gives the operator a good feel for rudder position without looking at the lever itself. For more precise rudder control during maneuvering, use the helm. Use the autopilot for steady course keeping in transit.

C.3. Split throttle turn

Making fast and effective turns requires knowledge of the boat's capabilities and skill in handling. A full power, full rudder, 180 degree turn takes over 20 seconds to complete, as seen in figure 5-4. For this reason, splitting the throttles and pivoting may be your preferred method in certain conditions. The technique for performing this split throttle turn is outlined below.

CAUTION!

The steps described in the "split throttle" turn are designed to achieve a faster turning speed while reducing the wear and tear on the entire propulsion system. This maneuver should only be used in the most extreme of circumstances.

Step	Action
1	Assume the boat is traveling forward at maximum RPM and a turn to port is going to be executed.
2	Pull the port throttle back to forward detent position while shifting the rudder to full port.



Step	Action
3	Watch RPM indicator for the port engine. When it has dropped to 700 RPMs, with a slow and steady motion, shift the port throttle through neutral to the reverse detent. After the engine has engaged, apply reverse power as required.
4	As the bow swings through the turn and is approximately 30 degrees from completing the turn, begin shifting the rudder to amidships and return the port throttle to ahead as required. This maneuver should take less than 15 seconds.

C.4. Restricted maneuvering

In restricted maneuvering some operators choose to use only the throttles, leaving the rudders amidships. This technique can work well but operators should be familiar with combined rudder and propulsion techniques, which may be required in high wind situations, or with vessels alongside.



Head seas

C.5. General

The primary considerations when advancing in head seas are to maintain forward momentum and keep the bow into the swell. The sturdy and buoyant construction of the boat allows it to ride up over oncoming seas.

C.6. Speed

WARNING 💖

In large and cresting head seas, apply only enough power to climb face of wave. Excessive power can cause the boat to become airborne as it exits the wave, resulting in a violent slam.

The boat rides well at full speed in open head seas up to 6'. Head seas over 6' may require that the speed be reduced as necessary to soften the ride. Increased sea states may dictate further speed reductions for the benefit of crew safety. Relatively smaller, but steeper seas (steep chop) may require that the speed be reduced in lesser sea states. Large open ocean ground swells typically pose no problem however and speeds can be increased and adjusted to accommodate crew comfort. The coxswain must find a safe and comfortable speed, keep both propellers in the water and avoid burying the bow in a wave.

NOTE &

A feature of the control system of the 47' MLB allows the coxswain to control both engines with one throttle handle. With this feature enabled, the control system automatically synchronizes the RPMs for both engines allowing the coxswain to constantly adjust speed for wave action without concern for balancing engine speed. This feature should not be used while in a heavy weather or surf zone or in confined areas.

C.7. Quartering the seas

Taking larger head seas slightly off of either bow can create a more comfortable ride, as the boat may proceed more gently off the back of the wave instead of slamming violently. The speed and angle of approach will have to be adjusted as needed for the optimum ride. This is sometimes referred to as quartering the seas, which is not to be confused with taking a following sea on the quarter.



Stern to Seas

C.8. General

Following open seas up to 10' can be negotiated at full speed as long as the boat remains stable as it travels down the front of the swell. Following seas over 10' may require a reduction in speed to maintain stability and avoid injury to the crew.

WARNING ♥

While operating the 47' MLB stern to the seas >6' and RPMs >1800, the boat is prone to being *caught on the hardchine*. Being *caught on the hardchine* is best described as the boat suddenly heeling over 50-80 degrees on a false keel. The coxswain's corrective action shall be to <u>immediately reduce power</u> to return the boat onto the true keel.

C.9. Using the stern for alternative options

With the majority of the weight aft and seven feet of freeboard, the stern is a stable and protected platform in seas up to 12 feet and surf up to 8-10'. Low RPMs and split throttle maneuvering techniques work well to shift the stern in the desired direction. This capability offers alternative "stern-to" station keeping and tow approach options.

C.10. Riding the back of a wave

Inbound in breaking waves over 10', position the boat on the back of a wave and adjust the speed so the boat will ride in on the back of the wave. While riding on the back of a wave in heavy weather, monitor the boat's speed closely to avoid overtaking the wave as its speed toward shore decreases.

WARNING 💖

The 47' MLBs speed often allows the coxswain to position the boat on the back of an incoming wave. Take care not to position the boat too high on the back of the wave as this is the part of the wave that quickly gains speed and plunges as it breaks. If the boat is too high or too fast, the boat may go over the front of the wave as it breaks.

WARNING ®

Despite it's speed, it is possible for the 47' MLB to be overtaken by waves under certain conditions. Pay close attention to wave activity astern of the boat when proceeding inbound on breaking waves.



Beam Seas

C.11. Steering

Whenever possible, the coxswain should avoid steering a course parallel (broadside) to heavy swells. Tack across the swells at an angle (30 to 40 degrees). If necessary, steer a zigzag course, making each leg as long as possible and adjust the boat speed for a safe and comfortable ride. Seas directly off the beam of the boat can cause adverse rolling conditions.

When transiting parallel to the seas, the boat will tend to ride the contour of the wave surface. This means that the boat's vertical axis will remain perpendicular to the surface on which the boat is operated. A wave face of 20 degrees will cause a 20 degree heel.



Effects of Wind

C.12. Turning the bow

In calm or negligible wind and seas the 47' MLB responds well using standard twin screw operating practices. In stiff winds, several design features combine to make handling this boat challenging. With the majority of weight and the deepest draft aft, the bow is very susceptible to the effects of the wind. Winds exceeding 25 knots have a dramatic effect on maneuverability and can often be the predominant environmental factor in maneuvering situations. In winds exceeding 30 knots, it can be difficult to recover and turn the bow into the wind at slow speeds (station keeping, towing approaches). Spilling whitecaps may combine with the wind to compound this problem, as they too will push the bow around. When towing, the bow becomes even more susceptible to the effects of the wind as the towed vessel tends to hold the stern down.

C.12.a. Restricted maneuvering

In restricted maneuvering situations (alongside, at marinas, piers, wharves, etc.) analyzing the environmental conditions and using them to help rather than hinder operations is the way to deal with the large sail area created by the bow and superstructure.

C.12.b. Towing in winds

Bow into weather towing approaches become very difficult if the wind exceeds 30 knots. Once the wind catches the bow, it can be difficult to turn the bow back up into wind while station keeping. Stern-to approaches often solve this problem.



Station Keeping

C.13. General

Station keeping in both surf and open water requires concentration to maintain a constant heading and position. The boat tends to work well with its stern to the wind as the bow tends to "weathervane" downwind. If stern-to station keeping is not an option, the operator must use extra care to counteract environmental factors.



Section D. Surf Operations

D.1. General

Surf or bar conditions require constant attention by the coxswain. The coxswain should not rely solely on the boat's speed to outrun a wave nor rely on its excellent survivability to withstand a large wave. In surf, the boat can become airborne very easily. Although the 47' MLB is designed to operate in surf, breaker avoidance is the preferred practice in most situations.

D.2. Recognizing a wave

The height of eye (about 14') from the open steering station may give the false impression that wave height is less than it actually is. If you are in a trough and are directly level with the crest of a wave, the wave is approximately 14' tall; anything less can look especially small. As has been previously experienced, under the right conditions, a 10' wave can roll the 47' MLB well beyond 90 degrees.

D.3. Outbound in waves under 14'

Use the minimum amount of power required to keep the bow heading into the wave. Excessive power will produce speed, which can launch the boat off the back of the wave resulting in a hard landing that may damage the boat or cause injury to the crew. The commonly used term for this approach is "dead stick." In steep, fast moving, lively surf where under currents and turbulence affect control, slight forward momentum is recommended when breakers are encountered. This is critical to maintain the desired direction of approach. Square to the seas with bow pointed toward any breaking wave. Recovery time between breakers can be sometimes only three to five seconds. Split throttles with generous amounts of power may be necessary to maintain optimum direction.

D.4. Outbound in waves over 14'

It may be necessary to apply power to push the boat over the top of the wave. Apply only enough power to climb the face and push the bow over the top; too much power will result in a launch as previously described.

White water should always be taken on the bow. Wind on or leeward of the beam when climbing steep faces may also blow the bow around as the boat goes over the top of the wave. This may result in an uncomfortable landing with the boat at a less than optimal angle to encounter the next wave. Strong wind (>20 knots) requires constant attention to keep the bow oriented toward the surf.

CAUTION!

When climbing the face of steep waves, the boat's forward buoyancy causes it to assume a substantial bow-up attitude creating a sensation that the boat is vertical and that it may "reverse pitch-pole." This may result in an urge to apply excess power. This urge must be suppressed to avoid launching off the back of the wave.



D.5. Inbound

When overtaking waves in a surf zone, or steep open water seas, there is a tendency to lose rudder control. As the boat pushes over and starts down the front of a wave. The bow may veer off and rudder control may be reduced to a minimum. This is often easily solved by a power reduction on the outboard shaft. If not, power reduction on both shafts may be necessary to regain control

D.6. Stern to station keeping

When keeping station in surf up to 6', applying approximately 1000 RPM astern for 1-2 seconds will keep the boat from surging forward as the wave passes. Surging breakers up to 10' or spilling white water generated by breakers up to 10' can be taken on the stern as the water shoots straight up and passes around the stern. Again, a brief application of astern power will help to maintain position. It is important to gain sternway prior to being struck by the surf on the stern. In the event surf larger than 10' must be taken on the stern, significant and higher engine RPM will be needed (meet power with power).



Section E. Towing

E.1. General

CAUTION!

During normal operations engines should not overload for more than a few seconds if at all. Continually overloading the engines and/or overriding the DDEC system shortens the service life of the engines significantly.

The 47' MLB has enough power and the right equipment to handle any emergency towing job likely encountered. The coxswain should consider all factors concerning weather, sea state, distance to tow, and size of vessel before attempting each tow. General towing limitations are set at 150 displacement tons. Under particularly favorable conditions the boat may be safely able to tow vessels up to 200 tons with permission from the operational commander.

NOTE &

The DDEC control system is equipped with an engine overload protection feature which allows the coxswain to exceed the maximum power curve for a set period of time. Temporarily overloading of the engines may occur during surf operations, towing evolutions and single engine operations.

When the engine(s) have been in an overload condition for more than one minute, the EDM(s) will give an audible alarm and displays "Code 410". This warning will be displayed for two minutes. If no action is taken for two minutes, the EDM(s) will then display "Code 58" and the engine output will automatically ramp down to the maximum allowed power curve.

If operations necessitate, the coxswain may override this automatic ramp down by pressing and releasing the "Overload" button on the station control panel. This can be pressed anytime during a overload situation and will allow an additional two minutes of operation above the maximum power curve.

E.2. Approaches

The prevailing winds and seas can greatly affect the ability to safely approach and take another vessel in tow.

E.2.a. Bow to the wind

The "traditional" bow into the prevailing conditions towing approach is not always the most effective. When approaching and station keeping with the bow into the seas, the coxswain must be aware of a "see-saw" effect which greatly affects crew performance on the fantail. As the 47' MLB climbs the front of a swell and as the swell passes under the boat, the boat "see-saws" or pivots just aft of the recovery well. This has a catapult effect on crew trying to work on the aft deck.

In addition, bow into the weather towing approaches become very difficult if the wind exceeds 30 knots. Once the wind catches the bow, it is nearly impossible to turn the bow back up into the wind while station keeping. This problem is compounded if large whitecaps are spilling off the seas, as they will further push the bow off.



E.2.b. Stern to the wind

Down swell, stern to the wind and seas towing approaches have proved to be very effective in conditions up to at least 10'. With a majority of its weight aft and nearly seven feet of freeboard at the transom, 47' MLBs can effectively take seas on the stern while providing a stable and protected platform for crew work. In addition, with the stern to the wind, the bow tends to "weathervane" downwind, making it easier to maintain station while taking a vessel in tow.

E.2.c. Safe zone optimal position

In both the bow to and stern to the prevailing condition approaches, the most successful method of taking the vessel in tow is to station keep with the towline worked off the beam.

NOTE &

Attaching a towline to the bow eye of a small boat is difficult from a 47'MLB. The height of the stern is too high, and when attempted from the recovery well, escape routes are limited if the two vessels were to strike together.

E.3. Affects of wind with vessel in tow

The coxswain should be aware of additional affect the wind may have on the 47' MLB with another vessel in tow. The aft tow bit tends to hold the stern down further enhancing the effect of wind on the bow. In addition, the coxswain should be aware of substantially increased fuel usage with a large vessel in tow.

E.4. Tow watch

The tow watch should be extremely vigilant in observing the condition and ride of the tow especially when the coxswain has retreated to the enclosed steering station. When towing vessels lower than the 47' MLB transom, or when towing with a long towline, chafing can occur along the transom. The tow watch should closely monitor this and react as necessary.

CAUTION!

The towline reel motor is to be used strictly to aid in stowage of the towline. Recovery of towline from the water should be done by hand. Once the towline is on deck, two crew members can easily and quickly stow the line back on the reel. One crew member should feed the reel while the other should operate the power button.



Section F. Anchoring

F.1. General

The 47'MLB does not often drop anchor. However, the boat is fitted with an anchoring system used when the boat must stand by a location or in an emergency.

F.2. Anchoring the boat

The port deck locker contains a 19 pound Fortress anchor, 9' of 3/8" stainless chain and 300' of 21/4" DBN.

Take the following steps to safely anchor the boat:

Step	Action
1	Fair-lead the bight of the anchor line outboard of all deck fittings on the port side; pass the line through the open bullnose, take all slack out of the line and take it to the forward tow bitt with one round turn.
2	While one crew member tends the anchor line at the forward bitt and as directed by the coxswain, release the pin securing the anchor in the port forward deck locker and remove the anchor from the bracket.
3	As directed by the coxswain the anchor should be dropped over the side well clear of the boat.
4	Once the anchor is tending "up and down" the coxswain should back down until the desired amount of scope is attained and the anchor line is secured.

F.3. Weigh anchor

Take the following steps to safely weigh anchor:

Step	Action
1	Position one crew member at the bitt and one between the bitt and the bullnose. As the coxswain moves the boat slowly forward, the forward crewmembers take up the slack in the line while maintaining one round turn at the bitt.
2	Once the anchor is at "short stay" the anchor line should be secured at the forward bitt.



Step	Action
3	Crewmembers can then attempt to break the anchor free from the bottom. If unable to do so the coxswain should move the boat slowly forward until the anchor breaks free.
4	Once free, the crewmembers can pull the remaining anchor line and the anchor onboard.
5	When the anchor is aboard, the coxswain should take up a stable course so that the crewmembers can stow the anchor and ground tackle in the port storage locker.



Section G. Helicopter Operations

G.1. Hoist working area

The 47'MLB provides a stable platform for helicopter hoists however several design factors are worthy of consideration. First, the aft location of the boat's mast, makes for a small working area in which the helicopter and boat crew can work from. The trail line method is often the safest way to conduct the hoist. Secondly, noise from the helicopter makes radio communications difficult from the open bridge.

G.2. Crew placement

A common crew placement strategy is to have two crew members on the stern to work the hoist. The third crew member remains on the open bridge as safety observer and communicates via hand signals with the coxswain who controls the boats course and speed from the either the open bridge or the enclosed bridge. From the open bridge it is easier for the coxswain to monitor the progress of the hoist while from the enclosed bridge it is easier to maintain communication with the helicopter while steering the boat on the assigned heading. The problems with both options must be considered by the coxswain in making a risk management decisions.

G.3. Procedures

Detailed procedures and instructions on helicopter operations are contained in the Boat Crew Seamanship Manual (COMDTINST 16114.5 series).

CAUTION!

Crews conducting trail line hoist evolutions must tend the trail line at all times. The design of the aft deck will not contain slack line if loose on the deck. This may result in the trail line fouling the MLB's propellers or shafts if it goes over the side.

Chapter 6 - Mission Performance





Section H. Personnel Recovery

H.1. Pick-up ports

The port and starboard deck recesses or "pick-up ports" are designed to allow for recovery of personnel in the water despite the 47' MLBs high freeboard. The side recess grating is capable of supporting two 180 lb crew members under a force of 3 g's. The grating hinges against the side of the deckhouse; two locking pins retain the grating in the up or down position. Only one person is necessary to raise or lower the deck grating but it is faster and safer if two persons are used.

NOTE &

Gratings should be secured in the up position prior to heavy weather and/or surf operations. This prevents unnecessary hazard to the crew.

H.2. Controlling the boat

From the open bridge the coxswain can use either port or starboard steering station to control the boat during recovery of personnel in the water. This affords the coxswain excellent visibility during the approach as well as during the recovery efforts in the deck recess.

H.3. Deck recess

There are several D-ring attachment points in the vicinity of the deck recess that allow crew members to clip in while conducting personnel recovery. Crew members should be aware that movement is limited within the deck recess area and that moving the victim once aboard may be difficult.

CAUTION!

During personnel recovery efforts in heavy weather or surf conditions, the deck recess is extremely vulnerable to wave action.





Section I. Ice Conditions

I.1. General

The 47'MLB is not designed to break ice and should avoid operations in this capacity if at all possible. The MLB can, however, operate through light surface ice up to 4" thick if necessary to reach open water. Do not exceed 1000 RPMs when operating in ice conditions. In slush conditions, ensure that the sea water cooling system is checked regularly to ensure clogging has not occurred. Operations at high speed (during cold weather) will increase the likelihood of topside icing due to freezing spray.

Warning 💖

Excessive topside icing will greatly affect the boat's stability and righting arm

Note &

Be aware that freezing spray may seal hatches and scuttles thus limiting immediate or emergency access (i.e. aft deck box stowage). Recovery recess gratings may become iced in place. Prudent operations under these conditions may be to run with the port grating down (for safe access to the forward deck) and the starboard grating up (for PIW recovery).

Chapter 6 - Mission Performance





Section J. Securing Procedures

J.1. Procedure

The following procedures should be repeated after each mission:

Step	Action
1	Secure all electrical and electronic components on the open steering station.
2	Secure all electrical and electronic components in the enclosed steering station.
3	Secure engines using push buttons in the enclosed steering station.
4	Secure start system cutout switches in the enclosed steering station overhead console.
5	Install shore-tie cable to the boat energize dock side shore power.
6	Energize equipment breakers in the 120-volt AC power panel auxiliary machinery space. Ensure battery charger is operating normally.
7	Secure all breakers in the 24-volt power panel in auxiliary machinery space except for compartment lighting and bilge pump system.
8	Secure all electronic equipment breakers in the 12-volt power panel auxiliary machinery space.
9	Secure HVAC cooling system valve in the auxiliary machinery space starboard side.
10	Secure start system battery cutout switch in the survivors' compartment.
11	Secure sea suction valves for the engines under the ladder in the engine room.
12	Check all machinery fluid levels and refill as necessary.
NOTE	It may be necessary to wait 30 minutes to obtain an accurate reading on engine lube oil levels.
13	Conduct a visual inspection of the engine room and machinery spaces and their bilges for any obvious abnormalities.

CAUTION!

Do not check engine coolant levels until temperature has dropped to 160 degrees or below.

14

15

Clean engine room bilges and machinery.

Sound fuel oil tank and refill to 95% (373 gallons).



Step	Action
16	Secure all watertight doors, hatches, and covers
17	Wash the boat down with fresh water.

NOTE &

Keeping the boat clean and neat is very important to control corrosion. Having aluminum in contact with dissimilar metal, particularly a copper alloy can cause major corrosion problems. Something as small as a penny left in the bilge can cause serious damage. Maintaining corrosion control is the responsibility of everyone in the crew.

NOTE &

The mission is not complete until the boat is ready for the next mission.



Chapter 7 Emergency Procedures

Overview

Introduction

Responding to emergencies and equipment casualties aboard the 47' MLB should be second nature to all members of the crew. The ability of crew members to take immediate action to control emergency situations is critical to prevent a bad situation from getting worse. While every event is different, step-by-step procedures help gain control of the casualty and aid in troubleshooting.

The first step in all casualties is to protect the immediate safety of all crew members and to establish communication amongst the crew as to the nature of the casualty. It is the coxswain's responsibility to keep the station informed of all emergencies encountered during the operation of the boat.

The coxswain and engineer should work together to determine if equipment casualties can be safely repaired while underway. The coxswain must decide whether a casualty has impacted the ability of the boat and crew to complete the mission. The coxswain should not make the decision in a vacuum; input from other crew members, especially the engineer, as well as communication with shoreside personnel should be used to determine whether to continue with the mission. The following factors should be considered:

	Factors
1	The safety and physical condition of the crew and vessel
2	Equipment limitations due to the casualty
3	Current and forecast weather and sea conditions
4	The urgency of the mission

In this chapter

This chapter contains these sections.

Section	Topic	See Page
A	Capsizing	7-3
В	Striking a Submerged Object	7-5
C	Steering Casualty	7-7



Section	Topic	See Page
D	Reduction Gear Failure	7-9
Е	Fire in the Engine Room	7-11
F	Fire in the Auxiliary Machine Space	7-13
G	Loss of Control of Engine RPM	7-15
Н	Loss of Fuel Oil Pressure	7-17
I	Loss of Lube Oil Pressure	7-19
J	Main Engine High Water Temperature	7-21
K	Recessive shaft Seal Leakage	7-23
L	Flooding	7-25



Section A. Capsizing

A.1. Preparation

Any surface activity big enough to roll the boat will bring it right back up. If your lower gunwale digs into the trough, prepare to roll over. Take a deep breath and hang on. Average time under water will be approximately 8 to 12 seconds. Although the boat was built to withstand a roll over, there may be damage.

A.2. Recovery

Once righted, assess the situation quickly. You will still be in the surf and must take immediate action to take the next wave correctly or the boat may roll again. Check the crew to ensure no one was lost overboard or injured. Check for lines overboard that might get caught in the propellers. If the engines are still working, move to safe water.

A.3. Actions

Once in safe water, take the following actions:

Step	Action
1	The boat engineer should go below to check for damage.
2	Investigate the condition of the engine room by looking through the window in the watertight door. The engine room may be coated with water and oil presenting a fire hazard.
3	Begin de-watering the vessel by energizing all of the installed electric bilge pumps. If the flooding is too severe to be handled by the electric bilge pumps, rig the CG-P5 on the aft deck and connect the suction line to the engine room suction standpipe.
4	Once dewatering is complete, check the oil in both main engines (Engines must be secured to ensure an accurate reading). Add oil as necessary.

NOTE &

Engines should be shut down to check oil level; if circumstances make securing the engines inappropriate, wait to check the oil levels until the situation has further stabilized. In the mean time, keep a close eye on the engine oil pressure

5	Closely check the material condition of each compartment. Report results to the coxswain.
6	After damage has been assessed, determine whether it is safe to proceed with the mission or should you return to the unit.



Step	Action	
7	Upon returning to the station all electronic and electrical equipment must be removed and cleaned.	
portable V	means of communications is critical after a capsizing or knockdown. A HF/FM radio is the best means of passing critical situation reports ly following this type of situation.	
	· Control of the cont	

WARNING ®

NOTE &

NOTE &

equipment must be tested thoroughly. The engine room must be washed down and all insulation material in the survivors' compartment must be inspected. All fluids and associated filters, such as reduction gear, hydraulic system, and main engine oil should be replaced.



Section B. Striking a Submerged Object

B.1. General

Because of the nature of MLB operations, it is not uncommon for the boat to strike submerged objects or bump the bottom. With the speed of the 47' MLB and exposed shaft and strut system, striking a submerged object can potentially cause serious damage and affect your ability to continue a mission.

B.2. Action

Upon striking a submerged object, take the following actions:

	Step	Action
	1	Reduce engine RPM to neutral, and try to determine what was hit by the boat; inform the rest of the crew.
	2	The engineer and a crewman should proceed to the Survivors' Compartment to check shafting for vibration and damage. As the coxswain places the engines in gear, check propeller shaft seals for excessive leakage.
	3	The crewman should check all forward compartments for damage. The engineer should check the engine room and lazarette for damage. Make reports to coxswain
	4	Individually bring up the engine RPMs to determine range and severity of vibration.
	5	Maintain engine RPM below range of vibration. If vibration is too severe, place that shaft into neutral or secure engine.

NOTE &

If possible, the boat should be hoisted to determine extent of damage; especially if there is a vibration.

Chapter 7 – Emergency Procedures





Section C. Steering Casualty

C.1. Symptoms

While steering the boat, the wheel turns sluggishly or steering controls have no effect at all. If a steering casualty does occur with the main power assist hydraulic system, the manual servo system on the open starboard steering allows the helmsman to continue to have positive control of the steering system from that station only, albeit with less responsiveness. When a complete loss of steering occurs, the coxswain or helmsman can continue to the steer the boat with the engines alone.

C.2. Actions

When a partial or complete loss of steering control occurs, take the following actions:

Step	Action
1	Reduce engine RPM to clutch ahead and inform the crew. Ensure the steering station is active.
2	If the steering gear low pressure light is energized, SECURE both engines. If there is no hydraulic oil pressure or no oil in the reservoir, the engine must remain secured to avoid damage to pumps and/or engines.
3	Engineer should enter the engine room, if safe, and look for obvious hydraulic leaks, check bilge, check hydraulic pressure gauge and reservoir level. Manual system gauge should read 20–30 psi. Power system gauge should read 150–250 psi. Reservoir level should be ½–¾ full.

WARNING 💖

There is a steering pump attached to each engine. This will allow the coxswain to steer the boat with only one engine running. The helm unit will work only if there is fluid in the system. The steering pump will be destroyed and possibly cause engine damage if either engine is run with no fluid in the power steering system!





Section D. Reduction Gear Failure

D.1. General

Both the electronic control system and the reduction gear system are activated from the throttle control stations.

D.2. Actions

If the boat does not respond when the throttle(s) are operated in forward and reverse, take the following actions:

Step	Action
1	Bring the throttles back to neutral, ensure the active light is lit at the control station in use. If the light is not lit and control can not be taken, secure the affected engine (s).
2	The engineer should proceed to the auxiliary machinery space and check both Gear Interface Modules breakers on the 24 volt power panel to ensure the breakers have not tripped.
3	The engineer should then proceed to the survivors' compartment and remove the deck plates to examine the affected reduction gear.
4	Check the reduction gear lube oil level. Check all reduction gear sensors to ensure they are properly connected and secure.
5	If no leaks are present and the oil level is full, restart the engine and observe clutch apply pressure (250–290 psi when the clutch is engaged).
6	If the clutch apply pressure is not sufficient, secure the engine and reduction gear.
7	If all mechanical checks have been made, proceed to troubleshooting the electronic controls.

NOTE &

In the event of reduction gear electronic control failure, the reduction gear control valve can be operated manually by pushing in on the pin located at the solenoid end cap and locked into position by inserting the locking pin into the hole at the top of the end cap.

8	Attempt to take throttle control at each of the remaining throttle control stations.
9	If control cannot be taken from any of the stations, the coxswain should proceed to the enclosed bridge and energize the emergency engine control toggle mounted on the lower console just above the throttles. This system bypasses all throttle sensors.



Step	Action
10	The coxswain can control the reduction gear direction by using the forward/neutral/reverse toggle and can control engine RPMs by turning the rheostat for each engine.

NOTE &

If a long distance must be traveled to return to a station, each reduction gear is fitted with a "Come Home" device that can lock the forward clutch packs together for operation.



Section E. Fire in the Engine Room

E.1. Symptoms

The engine room has a fire alarm system that sounds when the temperature in the engine room exceeds 190 degrees. In addition, signs of smoke coming from the engine room vent indicate an engine room fire.

E.2. Actions

In the event of an engine room fire, take the following actions:

Step	Action
1	The coxswain should secure the engines, inform all crew members and notify the station. The coxswain should direct a crew member to close the air intake valves in the port and starboard aft buoyancy boxes.
2	The engineer should proceed to the Survivors' Compartment and ensure the engine room watertight door is tightly closed then secure the fuel oil by pulling the emergency fuel cutout valves.
3	The engineer should energize the CO ₂ System by releasing the locking pin and depressing the handle on the CO ₂ system actuator or by pulling the ring at the CO ₂ bottle.

NOTE &

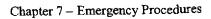
There is a 30 second delay built into the CO₂ system; this delay can be manually overridden by pulling the CO₂ release handle on the delay system mounted on the starboard bulkhead of the survivor's compartment.

The engineer should proceed to the auxiliary machinery space and secure all the electrical breakers on the DC power panel with the exception of the VHF-FM radio.

WARNING 💖

It is extremely dangerous to enter a compartment during or after a fire. After the engine room has been flooded with CO₂, extensive ventilation is necessary to ensure safety when entering, however any introduction of oxygen into the compartment may ignite a fire reflash. Keep the space sealed until towed ashore and secured.

5	Keep the engine room secured until towed ashore and secured.
6	As much as possible, stay off of the after deck as the heat may
	have caused structural damage.







Section F. Fire in the Auxiliary Machinery Space

F.1. Actions

There are no fire or smoke detectors in the auxiliary machinery space. In the event a crew member observes smokes coming from the auxiliary machinery space vent, take the following actions:

Step	Action
1	The coxswain should secure the engines, inform all crew members and notify the station.
2	The engineer should proceed to the survivors' compartment and secure the battery disconnect switches on the port forward bulkhead.
3	Ensure that the watertight doors leading to the auxiliary machinery space are closed.
4	Keep the auxiliary machinery space sealed until towed ashore and secured.

WARNING

In the event of a fire in the space, do not enter the auxiliary machinery space compartment under any circumstances. There is not an installed fire fighting system for this compartment.

Chapter 7 – Emergency Procedures





Section G. Loss of Control of Engine RPM

G.1. Actions

In the event an engine's RPMs can not be controlled, take the following actions:

Step	Action
1	Ensure the active light is lit for the control station in use.
2	Bring the engine control back to clutch ahead.
3	If this fails to control the engine RPMs, switch to a different control station and attempt to take control or attempt to energize the emergency back up panel in the enclosed bridge.
4	If this fails, push and hold down the engine stop button for the affected engine.
5	If the engine fails to secure, the engineer should proceed to the survivors' compartment and pull the fuel cutoff valve for the affected engine and allow the engine to run out of fuel.
6	If time does not allow for the affected engine to run out of fuel or if the fuel cutoffs fails to secure the engine, the coxswain should pull the emergency air shutdown for the affected engine.
7	Do not restart the engine until the problem has been corrected.

WARNING 💖

DO NOT use the CO₂ system to secure the engine. Depleting the fire fighting capabilities of the boat can be dangerous.

Chapter 7 - Emergency Procedures





Section H. Loss of Fuel Oil Pressure

H.1. Symptoms

If a loss of fuel oil pressure occurs, the engine will begin to run rough with a rapid loss of power. The EDM alarm will sound and flash a Code 48 (Fuel Oil Pressure Low) warning.

H.2. Actions

In the event of a loss of fuel oil pressure, take the following actions:

Step	Action	
1	The coxswain should reduce RPMs to clutch ahead, determine which engine has lost power and inform the crew.	
2	The engineer should proceed to the engine room, look through the port light in the engine room door to ensure that its safe to enter.	
3	If it is safe to enter, check the bilge to see if any fuel has spilled.	
4	Check the emergency fuel cutout valves to ensure that they are open.	
5 Check the primary fuel filters for accumulated sediment in the bowls. Replace if suspect. Re-prime the system.		
6	Check the entire fuel system for obvious leaks; check fuel tank level.	
7	Re-start the engine and check for proper operation.	
8	If the problem still persists, secure the engine.	

Chapter 7 - Emergency Procedures





Section I. Loss of Lube Oil Pressure

I.1. Actions

If the EDM alarm sounds and flashes a Code 45 (Oil Pressure Low) take the following actions:

Step Action	
1	The coxswain should reduce the engines to clutch ahead, determine which engine has loss of lube oil pressure.

NOTE &

The lube oil alarm is variable, which means that at any given engine RPM, the oil pressure must be within a certain range or the alarm will sound. The lube oil alarm may be directly related to engine temperature; an overheating engine may set the lube oil alarm off.

2	Immediately secure the engine and inform the engineer and other crew members of the casualty.
3	The engineer should proceed to the engine room, look through the port light in the engine room door to ensure that its safe to enter.
4	If it is safe to enter, enter the engine room and check the bilge for oil.
5	Check the engine lube oil for quantity and quality and for obvious leaks.
6	Check the recovery tank for contamination.
7	If the cause is not correctable, do not restart the engine.

NOTE &

In an emergency, oil pressure can be run as low as 5 psi at idle and 32 psi at full load.

Chapter 7 - Emergency Procedures





Section J. Main Engine High Water Temperature

J.1. Actions

If the EDM alarm sounds and flashes a Code 44 (Coolant Temperature High) take the following actions:

Step	Action
1	The coxswain should reduce the engine RPMs to clutch ahead and determine which engine has overheated and inform the crew.
2	The engineer should proceed to the Survivors' Compartment, look through the window in the engine room WTD and report what temperature has been reached.
3	If steam is present or if the temperature is 220° F or above, secure the engines.

WARNING

If steam is flowing from the expansion tank vent, the engine(s) should be secured and cooled naturally. If the pressure is released when extremely hot by removing the expansion tank cover, the coolant will either flash to steam or boil with a serious potential for injury.

4	IF	THEN
	No steam is present	Enter the engine room and check the bilge and check the brass pipes on the inboard side of each engine for coolness for an initial determination of which engine water system (raw water or jacket water) the casualty is in.
	Pipe is cool	The raw water system for that engine is probably operating normally; the engineer should make initial casualty control checks for the jacket water system.
	Pipe is hot	The engineer should make casualty control checks for the raw water system.



J.2. Raw water system checks

Take the following action to check the function of the raw water system:

Step Action	
1	Verify that the sea suction valve(s) are open. Ensure that the deicing valves located just under the engine room step are closed.
2	Check the duplex strainers to ensure that the handle is pointing to one strainer or the other. Shift and clean the strainers as necessary.
3	If the strainers are clean, check the raw water pump cover lightly with the back of the hand for coolness. If the impeller is burned up, the cover will be very hot. If the cover is hot, secure the engine and replace the impeller.

NOTE &

If one engine has overheated due to a clogged sea strainer, the other engine may be close to overheating for the same reason.

J.3. Jacket water system checks

Take the following actions to check the function of the jacket water system:

Step	Action
1	Check the jacket water level. Check the engine and bilge for leakage. Replace fluid if necessary.

NOTE &

Anti-freeze is poisonous. Do not inhale the fumes.

2	Inspect the jacket water pump for normal function.
3	Check lube oil for proper quantity and quality.
4	If jacket water leaks are found, the pump is inoperative or if temperature continues to climb, secure the engine.

NOTE &

Oil alarms and sensors are directly related to engine temperature. An overheating engine will often set off lube oil alarms.

CAUTION!

If after all efforts have been made at casualty control, including reducing the engine load, the engine temperatures do not decrease, secure the engine. The manufacturer recommends shutdown of the engine if the temperature exceeds 220°F.



Section K. Excessive Shaft Seal Leakage

K.1. Actions

If the Survivors' Compartment bilge alarm sounds and upon inspection a shaft seal is found leaking excessively take the following actions:

Step	Action	
1	The engineer should inform the crew of the casualty.	
2	The coxswain should reduce the RPMs to neutral and secure the affected engine.	

CAUTION!

De-energize the Start Safety Switch in the engine room to prevent inadvertent starting of the engine while working around the cardan shaft.

3	The engineer should realign the seal assembly and check to see if the seal clamp has backed off.
4	If the clamp ring remains tight, restart the engine after realignment and roll the shaft. If excessive water continues to leak from the seal, secure the engine and shaft.
5	The engineer should then loosen the seal clamp ring and reposition it in a position which properly compresses the seal bellows.
6	Restart the engine and roll the shaft. If the seal continues to leak excessively, secure the engine and shaft and return to the station. After securing the shaft, tighten the emergency seal clamp ring (red).

NOTE &

The shaft must not be allowed to turn with the emergency seal clamp ring engaged.

Chapter 7 - Emergency Procedures





Section L. Flooding

L.1. Actions

In the event a bilge flooding alarm sounds, maneuver the MLB into a safe area and take the following actions:

NOTE &

A sounding of the
horn will indicate
water in the bilge
space.

Step	Action
1	The engineer will check the control panel to identify the space where flooding is indicated. Notify the coxswain and push reset to silence alarm.
2	The engineer and a crew member will proceed to the flooded space indicated by the control panel, look through the window in the watertight door and report status to coxswain. If directed enter space to investigate.
3	The engineer shall report to the coxswain the extent, cause and corrective actions necessary to control or stop the flooding.

NOTE &

The survivors compartment bilge space is divided by the fuel tank into port and starboard gear spaces, and must be checked separately for flooding.

4	The crew will prepare to apply basic casualty control procedures, making ready the damage control kit and CG P-5 pump as required.
5	The crew shall check the material condition of each compartment. Report results to the coxswain.
6	After damage has been assessed, determine whether it is safe to proceed with the mission or return to the unit.

CAUTION!

The bilge flooding alarm system is designed to notify the crew of an onboard EMERGENCY underway as well as dockside. This system should be confirmed operational prior to and upon return from any missions or sorties.

Chapter 7 - Emergency Procedures





Appendix A

47' Motor Lifeboat Outfit List & Stowage Plan

Overview

Introduction

This appendix is the standard stowage plan for the 47' MLB outfit. No deviation from this list is authorized, except in the event that the addition of portable equipment, not part of the standard boat outfit, is necessary to meet mission needs; units are authorized to temporarily carry this extra equipment.

This authorization is on case by case basis only, and care must be taken to properly secure any extra gear and to ensure it does not interfere with safe egress or the boat's standard outfit/systems. Under no circumstances shall permanent alterations be made to power, stow or in any way accommodate extra equipment.

In this Appendix

This appendix contains the outfit list and stowage plan for the following areas of the boat:

Area	See Page
Forward Compartment	A-3
Survivor's Compartment	A-4
Enclosed Bridge	A-5
Open Bridge	A-6
Main Deck	A-7
Engine Room	A-9





Forward Compartment

Item	Quantity	Location
Lube Oil (2104)	5 gal.	Port stowage bin, secured
Tellus T-15 Hydraulic Fluid	1 gal.	Port stowage bin, secured
Damage Control kit	1 each	Port stowage bin, secured
Hearing Protection	3 each	Port stowage bin, secured
Portable Marine Toilet	1 each	Port side on deck, secured
Heavy Weather Safety Belt	4 each	Bulkhead 15, secured May be kept readily accessible secured in Enclosed Bridge or Survivors Compartment
PFD'S (adult) type III, I.A.W. M10470.10 (series)	4 each	Port handrail, secured
PFD'S (adult) type I, I.A.W. M10470.10 (series)	5 each	Bracket starboard side Bulkhead 10, secured
PFD'S (child) type I, I.A.W. M10470.10 (series)	5 each	Bracket starboard side Bulkhead 10, secured
Blankets	4 each	Starboard stowage bin
Pillows (covered)	2 each	Starboard stowage bin
Bell w/Clapper (when not mounted)	1 each	Starboard stowage bin
Hand Held Spot Light	1 each	Starboard stowage bin
Boat Pyrotechnics, IAW M8000.2 (series)	1 kit	Starboard stowage bin
Mouth Horn, Reed, Fog	1 each	Starboard stowage bin
Crew Pyro Vest, IAW M10470.10 (series)	4 each	Hung with Type III PFD's Port handrail, secured
Stowage Boxes	2 each	Port/Starboard sides secured in brackets



Survivors Compartment

Item	Quantity	Location
Battle Lantern	1 each	Starboard bulkhead
Flashlight	1 each	Mounted on sink
Hearing Protection	2 each	Bulkhead 5, secured
Stokes Litter, IAW M10470.10 (series)	1 each	Port bulkhead, secured
Rescue Swimmers Pack, IAW M10470.10 (series) (Harness, min 70'Line, Mask, Fins, Snorkel)	1 each	On stokes litter
Fire Extinguisher, 5# CO ₂	1 each	Bulkhead 5
Fire Extinguisher, 10# PKP	1 each	Starboard bulkhead
EMT Kit	1 each	Bulkhead 5, secured
Water Jug	5 gallons	Port side above sink
Hot Cups	2 each	Bulkhead 5
Grounding Stick	1 each	Starboard bulkhead
Chow Box w/Emergency Rations	1 each	Center gear space, secured
Spare Parts Box (*)	1 each	Center gear space, secured

*Required Contents

(1) Primary Fuel Filters (2)	(6) Duct Tape (roll)
(2) R/W Pump Impellers (2)	(7) Electrical Tape (roll)
(3) R/W Pump Cover Gaskets (2)	(8) Air Pump
(4) Generator Belt (set)	(9) Misc. fuses and bulbs
(5) Alternator Belt (set)	



Enclosed Bridge

Item	Quantity	Location
Chart Table Light (red lens)	1 each	above chart box
Chart Box (*)	l each	Bulkhead by port chair
Battle Lantern	1 each	aft bulkhead
Binoculars (7X50)	1 each	Starboard bulkhead
Fire Extinguisher 10# PKP	1 each	Starboard bulkhead
Fire Extinguisher 5 # CO2	1 each	port side deck

*Required Contents

(1) Charts (as required)	(11) Tide Book(*)
(2) Pencils (as required)	(12) Coast Pilot(*)
(3) China Markers (as required)	(13) NAVRULS
(4) Stop Watch	(14) Light List(*)
(5) Search Pattern Slide Rule	(15) Nautical Slide Rule
(6) Parallel Rule	(16) Chart One
(7) Weems Plotter	(17) Note Pad
(8) Anemometer	(18) Compass Deviation Table
(9) Gum Eraser	(19) Flashlight with Red Lens
(10) Pencil Lead Sharpening Pad	(20) Compass and dividers

(*) Appropriate pages as required



Open Bridge

Item	Quantity	Location
Binoculars (7X50)	1 each	Under starboard console
Life Ring, 30" Diameter with 75'Floatable Line	2 each	Port/starboard side
Float Light w/Attachment Line	2 each	Port/starboard side
Throw Bags	2 each	on handrails
Bell w/Clapper (when mounted)	1 each	aft port handrail
Diver's Knife	1 each	Port stanchion, behind ladder



Main Deck

<u>Item</u>	Quantity	Location
Anchor 19 lb. Fortress (FX-37)	1 each	port forward deck locker
Anchor Line 2 1/4" DBN on Reel	300'	port forward deck locker
3/8" S/S Chain	9'	attached to anchor line
3/8" S/S Shackles	2 each	attached to anchor line
3/8" S/S Swivel	1 each	attached to anchor line
T-Handle	1 each	port forward deck locker
Fenders	4 each	port/starboard forward deck lockers
Alongside Lines (eight minimum)	as required	starboard forward deck locker
Boat hooks 8' and Holders	2 each	port/starboard superstructure
Towline 3 ¼" DBN	900'	lower tow reel
Towline 2" DBN	300'	upper tow reel
Tow Reel Hand Crank	1 each	on tow reel frame
Drop Pump, IAW M10470.10 (series)	1 each	starboard aft deck
Drogue/Grapnel Line 2" DBN with 2" S/S Thimble, 3/8" S/S Swivel, 3/8" S/S Shackle	200'	port aft deck box
Drogue, Small and Large	1 each	port aft deck box
Marlin	1 rl	port aft deck box
Heaving Lines	2 each	port aft deck box
Chafing gear	as required	port aft deck box
Assorted Shackles	as required	port aft deck box
Wire/Kevlar Bridle (optional)	as required	center aft deck box



Item	Quantity	Location
DBN Bridle	as required	center aft deck box
Block and Tackle assembly for mast	l each	center aft deck box
Skiff Hook (w/Pendant)	1 each	center aft deck box
Grapnel Hook 4#	1 each	center aft deck box
Stand Pipe Pick Up Hose	1 each	starboard aft deck box
Fire Fighting Hose 50'w/nozzle	1 each	starboard aft deck box



Engine Room

Tool Box 1 each in bracket on deck				
Tool Box 1 each in bracket on deck		<u> Item</u>	Quantity	Location
	Tool Box		1 each	in bracket on deck





Appendix B 47' Motor Lifeboat Boat Alterations (BOATALTS)

Overview

Introduction

This appendix contains a list of authorized BOATALTS for the 47'MLB.

NOTE &

For a complete breakdown of the Boat Alteration Number, see the Naval Engineering Manual, Chapter 041, COMDTINST M9000.6 (series).

In this Appendix

This Appendix contains the boat alterations for the 47' Motor Lifeboat.

Area	See Page
Boat Alterations (BOATALTS)	B-3





Boat Alterations (BOATALTS)

BOATALT Number	Subject	Date
47MLB-C-001	DGPS Upgrade	15 Jun 1999
47MLB-C-002	47' MLB Hull Markings Change	18 Jun 1999
·		

Appendix B - 47' Motor Lifeboat Boat Alterations (BOATALTS)





Appendix C

47' Motor Lifeboat Materiel Inspection Checklist

Overview

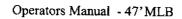
Introduction

- 1. This appendix is meant to be systematic means to inspect ANY 47' MLB and ensure the entire boat is prepared to meet mission demands. Also, this enclosure should be used in conjunction with Appendix A and B.
- 2. This checklist may be locally reproduced.

In this Appendix

This Appendix contains the Materiel Inspection Checklist for the 47' Motor Lifeboat. This inspection list covers the following areas of the boat:

No.	Area	See Page
I.	Forepeak	C-4
II.	Forward Compartment	C-5
III.	Auxiliary Machinery Space	C-7
IV.	Survivors Compartment	C-9
V.	Gear Space	C-11
VI.	Engine Room	C-13
VII.	Lazarette	C-17
VIII.	Enclosed Bridge	C-18
IX.	Open Bridge	C-22
X.	Mast Platform	C-25
XI.	Main Deck	C-26
XII.	Superstructure	C-29
XIII.	Hull	C-30
XIV.	Dockside Trials Port Engine	C-31
XV.	Dockside Trials Starboard Engine	C-32
XVI.	Under Way Trials Port Engine	C-33
XVII.	Under Way Trials Starboard Engine	C-34







Materiel Inspection Checklist

Boat number:	
Station:	
Date:	
References:	 47'MLB Operators Reference Guide, COMDTINST M16114.25 (series) Naval Engineering Manual, COMDTINST M9000.6 (series) Color and Coatings Manual, COMDTINST M10360.3 (series) Rescue and Survival Systems Manual, COMDTINST M10470.10 (series) MLB & UTB Standardization Program Manual, COMDTINST M16114.24 (series) PMS Manual, TP 3343
Inspection standards:	The following inspection standards apply to the 47' MLB's hull, superstructure, machinery, equipment, outfit, and installed systems and accessories: Operates smoothly and correctly Free of grease, oil, rust, and corrosion All fluids levels and pressure readings are within tolerances Protective coatings applied correctly and neatly Free of rips, tears, abrasions, and cracks Labels/test dates/placards properly indicated Outfit and equipment correctly installed/adjusted Outfit and equipment stowed according to specifications & stowage plan Free of non-standard/unapproved installations or equipment Maintained according to current manufacturer's guidelines and Commandant Directives
Inspection guidelines:	Inspection requires a minimum of two personnel, preferably one Boatswains Mate and Machinery Technician, both of who possess extensive 47' MLB experience and a strong working knowledge of the references listed above. This materiel inspection checklist is only applicable to boats in a "Bravo" or "Ready for Sea" condition. Each item on the checklist should be judged against the applicable Standard(s) and Reference(s). Additional discrepancies, uninstalled Boatalts, etc. should be listed.
Inspected by:	



I. Forepeak

	Std.	Non Std.	Remarks
Inspection cover			
Vent			
Bilge			
Bulkhead			
Overhead			
Drain plug			
Hand hold			
Step bar			

REMARKS:	 	



II. Forward Compartment

	Std.	Non Std.	Remarks
Deck hatch			
Escape ladder			
Dorade vent pipe with securing device			
Bulkheads			
Bulkhead 10 vent hole			
Stanchion			
Bilges			
Overhead			
Insulation			
Wiring/wire clamps			
Lighting /Switch			
Multi-cable transit run			
Deck Grating/Latches			
PFD Adult type III (4 ea) Port			
Handrail secured on hangers			
Crew signal kit vest (4 ea) IAW			
M10470.10 (series) w/Type III PFD's			
Heavy weather belts (4 ea) Secured			
may also be stowed for ready access in			
Enclosed Bridge or Survivors Compartment			
Porta Potti Secured			
Toilet paper/dispenser			
Life jackets Type I, 5 adult/ 5 child on			
bulkhead 10 brackets, secured			
Bilge pump/piping			
Bilge pump sensors			
Fire alarm			
Intercom			
Stowage bin (port) w/latch closure			
Lube Oil 2104 (5 gal.) Secured			
Tellus T-15 (1 gal.) Secured			
DC kit Secured			
Hearing protection (3 ea)			
Stowage bin (stbd) w/latch closure			



II. Forward Compartment (continued)

	Std.	Non Std.	Remarks
Blankets (4 each)			
Pillow (2 each)			
Bell with clapper (when not mounted)			
Handheld spotlight			
Boat Pyrotechnics IAW M8000.2 (series) boxed			
Mouth fog horn			

REMARKS:	



III. Auxiliary Machinery Space

	Std.	Non Std.	Remarks
WTD to fwd compartment			
Insulation			
Bilge			
Bulkheads			
Overhead			
Stanchions			
Handholds			
Step			
Deck grating/latches			
Batteries/box			
Bilge pump/piping			
Bilge pump sensors			
Isolation transformer			
Shore power circuit breaker panel			
All junction boxes			
24 volt power panel			
Amp. Meter			
Volt meter			
120 volt power panel			
Amp meter		_	
Volt meter			
12 volt power panel			
Amp meter			
Volt meter			
12 volt power converter			
Wiring/wire clamps			
Grounding plate			
ERIM			
EGIM			
Sea Power user panels			
Sea Power conversion units			
Battery charger			
CO ₂ bottles/piping			
HVAC R/W supply valve			



III. Auxiliary Machinery Space (continued)

	Std.	Non Std.	Remarks
HVAC R/W strainer			
HVAC R/W pumps/piping			
Multi-cable transit runs			
Lighting/switch			
Cables/cable penetrations			
Vents/vent motor			
Vent cleanout			
Auxiliary space vent fan switch			
Bulkhead piping penetrations			
EWRS compressor assembly/piping			
Placarding			

REMARKS:		
<u> </u>		



IV. Survivors Compartment

·	Std.	Non Std.	Remarks
WTD to Auxiliary Machinery Space			
WTD to Engine room			
WTD to aft deck			
WTD to Enclosed Bridge			
Insulation			
Bulkheads			
Overhead			
Reduction gear lifting eyes			
Wiring/wire clamps			
Handholds			
Ladder			
Step			
Windows			
Lighting/light switches			
Decking/latches			
Battery cutout switches			
Fuel stop pull handles			
CO ₂ SYSTEM			
Activation bottle			
Delay bottle			
Pressure switches			
Placards			
CO ₂ piping			
CO ₂ alarm panel			
Survivors seating			
Seat belts			
HVAC unit			
HVAC control panel			
HVAC R/W piping			
Vent ducting			
Vent cleanout (2 each)			
Hydraulic tubing			
Console vent fan/ducting			
All junction boxes			



IV. Survivors Compartment (continued)

	Std.	Non Std.	Remarks
Tow reel disconnect switch			
Battle lantern			
Sink			
Sink drain valve/piping			
Flashlight (mounted on sink)			
Hearing protection (2 each)			
Placarding			
Multi-cable transit runs			
Wiring			
Stokes litter secure	ed		
Rescue swimmers pack (on stokes with minimum 70' line, harness, mas fins, snorkel			
CO ₂ fire extinguisher (5 lb)			
PKP fire extinguisher (10 lb)			
EMT kit secure	ed		
Water jug			
Hot cups			
Grounding stick			
Intercom			
Lighting/switch			

REMARKS:		



V. Gear Space

	Std.	Non Std.	Remarks
Starboard side	<u> </u>		
Starboard reduction gear			
Reduction gear mount bolts			
Control valve			
Pressure build up valve			
Reduction gear cooler			
Duplex filter			
Floc fitting/hose			
Propeller shaft/seal			
Cardan shaft/seal			
Cardan shaft guard			
Wire/cable/wire clamps			
Insulation			
Pull cable connection box			
Center dividing screen			
HVAC R/W piping			
Bilge pump/piping			
Bilge pump sensors			
Bilge pump junction boxes			
Fuel tank level sensor			
Speed log			
Bilge			
Port side			
Port reduction gear			
Reduction gear mount bolts			
Control valve			
Pressure build up valve			
Reduction gear cooler			
Duplex filter			
Floc fitting/hose			
Propeller shaft/seal			
Cardan shaft/seal			
Cardan shaft guard			
Wire/cable/wire clamps	<u></u>		



V. Gear Space (continued)

		Std.	Non Std.	
HVAC R/W piping]		
Insulation				
Pull cable connection box				
Center dividing screen				
Vent drain piping				
Bilge pump/piping				
Bilge pump sensors				
Bilge pump junction boxes				
Transducer				
Bilge				
Center				
Fuel tank access cover	(3 each)			
Fuel tank stripping port				
Insulation				
Chow box	secured			
Spare parts box	secured			
2 primary fuel filters				
2 Raw water pump impelle	ers			
2 Raw water pump cover g	askets			
Generator belt set				
Alternator belt set				
Roll duct tape				
Roll electrical tape				
Air pump				
Miscellaneous fuses and bu	ılbs			

REMARKS:	<u> </u>	 	
	-		



VI. Engine Room

	Std.	Non Std.	Remarks
PORT ENGINE			
Block			
Heads			
Oil pan			
Gear train housing			
Exhaust piping			
Turbocharger			
Blower			
Airsep system			
Fuel system			
Fuel filters			
Lube oil system		-	
L/O filter with sampling valve			
Jacket water system			
Raw water system			
Air shutdown solenoid			
ECM			
MIM			
DDEC sensors			
Wiring/wire clamps			
Hotstart			
Generator/belts			
Alternator/belts			
Cardan shaft guard			
Cardan shaft/coupling			
Steering pump/hoses			
Engine mounts			
Starter			
FLOC system			
STBD ENGINE			
Block			
Heads			
Oil pan			
Gear train housing			



VI. Engine Room (continued)

	Std.	Non Std.	Remarks
Exhaust piping			
Turbocharger			
Blower			
Airsep system			
Fuel system			
Fuel filters			
Lube oil system			
Lube oil filter with sample valve			
Jacket water system			
Raw water system			
Air shutdown solenoid			
ECM			
MIM			
DDEC sensors			
Wiring/wire clamps			
Hotstart			
Generator/belts			
Alternator/belts			
Cardan shaft/coupling			
Cardan shaft guard			
Steering pump/hoses			
Engine mounts			
Starter			
FLOC system			
OVERHEAD			
Insulation			
Wiring/hoses/tubing			
Clamps			
24 volt DC lighting/switch			
Lighting junction box			
Exhaust piping/hangers			
Engineroom vent			
Soft patches			
CO ₂ strobe light			



VI. Engine Room (continued)

	Std.	Non Std.	Remarks
Smoke/heat detector		5000	
Hand holds			
Gauge panels			
AFT BULKHEAD			
Insulation			
Wiring/hoses			
Clamps			
Multi-cable transit run			
Mufflers/piping			
Dewatering standpipe			
Tow bit stanchion			
Placarding			
PORT SIDE			
Insulation			
Wiring/clamps			
Engine start interface panels			
Voltage regulator			
Bilge pump piping			
FWD BULKHEAD			
Insulation			
Wiring/hoses/tubing/cables			
Clamps			
All junction boxes			
Placarding			
24 volt DC lighting			
Cardan shaft seals			
Handholds			
Intercom			
Fuel tank sounding tube			
Multi-cable transit runs			
Bulkhead penetrations			
110 volt receptacle			
Engine safety switches			
CO ₂ siren			



VI. Engine Room (continued)

	Std.	Non Std.	Remarks
CO ₂ discharge nozzle			
Ladder with locking pins			
STBD SIDE			
Insulation			
Wiring/hosing/tubing			
Clamps			
Bilge pump piping			
Isolator junction box			
Alternator circuit breakers			
Alternator voltage regulator	T		
Steering system pressure gauge			
Steering reservoir			
Filter/cooler/control valve assembly			
Steering pressure switch			
Steering cooler raw water valve			
Auto pilot pump			
BILGE			
Grating/latches			
Wiring/clamps			
Fuel system piping			
Fuel emergency cutout valves			
Bilge pump/piping			
Bilge pump sensors			
Tool box			
Strut mount bolts			
Raw water butterfly valves			
Raw water strainers/piping			
De-icing valves			

REMARKS:		 	
		 	



VII. Lazarette

	Std.	Non Std.	Remarks
WTD			
Overhead			
Bulkheads			
Bilge	_		
Wiring/wire clamps			
Multi-cable transit run			
Lighting			
All junction boxes			
Bulkhead penetrations			
Bilge pump/piping			
Bilge pump sensors			
Standpipe			
Vent pipe			
Servo power cylinder			
Hydraulic hoses/tags			
Tie rod			
Rudder posts			
Rudder angle indicator			
Auto pilot indicator			

REMARKS:		 	



VIII. Enclosed Bridge

WTD to open bridge Overhead Bulkhead Deck Wring/cables/wire clamps Insulation Opening windows Heated windows Side windows Window blowers Helmsman chair port w/seatbelt Port chair joystick Helmsman chair starboard w/seatbelt Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Batte lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC unit ontrol panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel		Std.	Non	Remarks
Overhead Bulkhead Deck Wiring/cables/wire clamps Insulation Opening windows Heated windows Side windows Window blowers Helmsman chair port w/seatbelt Port chair joystick Helmsman chair starboard w/seatbelt Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel	WTD to open bridge	<u> </u>	Std.	
Bulkhead Deck Wiring/cables/wire clamps Insulation Opening windows Heated windows Side windows Window blowers Helmsman chair port w/seatbelt Port chair joystick Helmsman chair starboard w/seatbelt Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO ₂ fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel				
Deck Wiring/cables/wire clamps Insulation Opening windows Heated windows Side windows Window blowers Helmsman chair port w/seatbelt Port chair joystick Helmsman chair starboard w/seatbelt Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HFVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel		+	[
Wiring/cables/wire clamps Insulation Opening windows Heated windows Side windows Window blowers Helmsman chair port w/seatbelt Port chair joystick Helmsman chair starboard w/seatbelt Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC unit HVAC upit game in the side of the side		 	<u> </u>	
Insulation Opening windows Heated windows Side windows Window blowers Helmsman chair port w/seatbelt Port chair joystick Helmsman chair starboard w/seatbelt Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC upit HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel		-	<u> </u>	
Opening windows Heated windows Side windows Window blowers Helmsman chair port w/seatbelt Port chair joystick Helmsman chair starboard w/seatbelt Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel		ļ		
Heated windows Side windows Window blowers Helmsman chair port w/seatbelt Port chair joystick Helmsman chair starboard w/seatbelt Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC upit HVAC upit oping HVAC unit control panel Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel		<u> </u>		
Side windows Window blowers Helmsman chair port w/seatbelt Port chair joystick Helmsman chair starboard w/seatbelt Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel		ļ		
Window blowers Helmsman chair port w/seatbelt Port chair joystick Helmsman chair starboard w/seatbelt Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel		ļ		
Helmsman chair port w/seatbelt Port chair joystick Helmsman chair starboard w/seatbelt Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel		1		
Port chair joystick Helmsman chair starboard w/seatbelt Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel		1		
Helmsman chair starboard w/seatbelt Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel				
Starboard chair joystick Bolster seat port w/seatbelt Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel				
Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel	Helmsman chair starboard w/seatbelt			
Bolster seat starboard w/seatbelt CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel	Starboard chair joystick			
CO2 fire extinguisher (5 lb.) PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel	Bolster seat port w/seatbelt			
PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel	Bolster seat starboard w/seatbelt			
PKP fire extinguisher (10 lb.) Battle lantern Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel	CO ₂ fire extinguisher (5 lb.)			
Binoculars Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel				
Navigation light control panel Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel	Battle lantern			
Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel	Binoculars			
Ladder Handholds HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel	Navigation light control panel			
HF radio HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel				
HVAC unit HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel	Handholds			
HVAC piping HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel	HF radio			
HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel	HVAC unit			
HVAC unit control panel Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel	HVAC piping			
Deck drains Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel				
Multi-cable transit runs Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel				
Lighting/switch Red light glare protectors Windshield wiper motors Bilge alarm panel		†		
Red light glare protectors Windshield wiper motors Bilge alarm panel				
Windshield wiper motors Bilge alarm panel				
Bilge alarm panel				
Bilge pump control panel	Bilge pump control panel			



VIII. Enclosed Bridge (continued)

	Std.	Non Std.	Remarks
Hydraulic steering valves/piping			
Ventilation ducting			
All junction boxes			
CSIM (3 each)			
All placards			
Fluxgate sensors (2 each)			
Open bridge console access covers			
Wiring inside Open Bridge consoles			
Open Bridge console vent ducting			
EWRS			
CO ₂ back up actuator/pull string/seal			
Port water sensor			
Starboard water sensor			
EWRS tubing			
Port EWRS actuator			·
Starboard EWRS actuator			
EWRS test switch			
Port EWRS reset switch			
Starboard EWRS reset switch			
OVERHEAD CONSOLE			
Steering gear low psi warn. light/alarm			
Fuel gauge			
Dimmer switch			
Open bridge console vent switch			
Engine start control switches			
Electronic display modules			
Fire alarm test switch			
Dimmer fuse			
Fire alarm/warning light			
Blue light switch			
Weather deck lighting switch			
PORT CONSOLE			
Console access hatch/wiring inside			



VIII. Enclosed Bridge (continued)

	Std.	Non Std.	Remarks
Removable foot plate			
GPS			
Auto pilot			
Auto pilot select button			
Plotter			
Radar select switch			
Horn			
CENTER CONSOLE			
Digital compass	\top		
Window washer switch			
Window wiper switches			
Window heater switches			
Wiper speed controls			
Window blower switches			·
CO ₂ activation bottle/tubing			
Radar			
Depth finder			
Rudder angle indicator			
Throttle controls			
Throttle control panel			
Emergency back-up panel			
Engine start/stop buttons			
Searchlight control			
DDEC ignition switch			
Engine shutdown pulls			
Access cover			
STARBOARD CONSOLE			
Console access hatch/wiring inside			
Removable footplate			
VHF FM radio/speaker/microphone			
VHF direction finder/speaker			
Loudhailer/intercom/microphone			
VHF fuses			
Window heater fuses			



VIII. Enclosed Bridge (continued)

	Std.	Non Std.	Remarks
CHART TABLE w/locking pin		23	
Pencils			
China markers			
Compass and Dividers			
Stop watch			
Search pattern slide rule			
Compass deviation table			
Parallel rule			
Weems plotter			
Anemometer			
Gum eraser			
Pencil lead sharpening pad			
Tide book			
Coast pilot for area			
Navigation Rules, CIM 16672.2			
(series)			
Light list for area			
Chart One			
Note pad			
Nautical slide rule			
Flashlight with red lens			
Charts for area			
Chart table light (red lens)			

REMARKS:	 	,		



IX. Open Bridge

	Std.	Non Std.	Remarks
Windscreen			
Handholds			
Port helmsman chair w/seatbelt			
Starboard helmsman chair w/seatbelt			
Jump seats w/seatbelts (2 each)			
Handrails			
D-rings			
Vent pipe			
Port ring buoy 30" w/line & floatlight			
Stbd ring buoy 30" w/line & floatlight			
Throw bags (2 each)			
Binoculars			
Bell mount			
Bell w/clapper (when mounted)			
Docking lights			
Multi-cable transit run			
HF antenna coupler			
HF antenna			
Halyard cleat			
Safety line			
Placards			
Deck/non-skid			
PORT CONSOLE			
Rudder angle indicator			
Engine tachometers			
Throttle controls			
Throttle control panel			
Start/stop switches			
Joystick			
CO ₂ activation bottle			
Dimmer switch			
Remote spotlight connection			
Access cover			
Vent grating			



IX. Open Bridge (continued)

	Std.	Non Std.	Remarks
Console drain ball			
CENTER CONSOLE			
Depth finder			
Digital compass			
Fire alarm light			
Fire alarm silence switch			
Steering gear low pressure light			
Engine shutdown pulls			
Electronic display modules			
Radar enclosure			
Tray			
Radar enclosure door			
Radar			
Speakers			
STARBOARD CONSOLE			
Searchlight control panel			
Electronics enclosure			
Enclosure door			_
VHF radio			
GPS			
Loudhailer microphone			
Rudder angle indicator			
Gauge light dimmer			
Auto pilot select button			
Deck/spotlight lighting switches			
Throttle controls			
Throttle control panel			
Horn button			
Auto pilot			
Engine start/stop buttons			
Steering wheel			
Helm unit pump			
5-inch compass			
Console drain ball			



IX. Open Bridge (continued)

	Std.	Non Std.	Remarks
Access cover			
Vent grating			

REMARKS:		



X. Mast Platform

		Std.	Non Std.	Remarks
Flange mounts	(4 each)			
Stanchions				
Step				
Drain plug				
Mast receiver mount				
Radar antenna				
Loudhailer speaker				
Buoyancy box				
Blue light				
GPS antenna				
Aft deck working lights				
Forward/aft spotlight				
Horn				
Handholds				
D-rings				
Wiring				
Wire clamps				
Mast junction box				
MAST				
Wiring				
Wire clamps				
D-rings				
Masthead light	(2 each)			
Amber towlight	(2 each)			
Stern light	······································			
Searchlight				
VHF FM antenna				
VHF FM DF antenna				
Anchor light				
National ensign/Coast Gua	rd ensign			
Flag halyard				

REMARKS:		 	



XI. Main Deck

	Std.	Non Std.	Remarks
Tow bit		, Stu.	
Towline 3 ¼" DBN (900')			
Towline 3 ¼" reel			
Towline 2" DBN (300')			
Towline 2" reel			
Tow reel hand crank w/securing strap			
Diver's knife			
Taffrail			
Engine room soft patches			
Safety grab lines			
D-rings			
Paired bits (8 each)			
Closed chocks (8 each)			
Opening bull nose w/locking pin and			
retaining cable			
Forward anchor bit			
Forepeak vent			
Dorade vent	ļj		,
Escape hatch			
Deck			
Deck non-skid			
PORT RECOVERY RECESS			
Hinged walking flat with locking pins			
and retaining cables	<u> </u>		
Fuel tank vent			
Ladder			
Steps			
Handrail Sink drain nining			
Sink drain piping			
Grab lines along hull			
D-rings			
Drain flap	<u> </u>		



XI. Main Deck (continued)

	Std.	Non Std.	Remarks
STBD RECOVERY RECESS			
Hinged walking flat with locking pins			·
and retaining cables			
Ladder			
Steps			
Handrail			
Grab lines along hull			
D-rings			
Drain flap			
PORT FWD DECK LOCKER			
Anchor (19 lb.)			
Anchor line 2 ¼" DBN (300')			
Anchor line reel			
Anchor Chain SS (9 feet)			
³ / ₈ " SS Shackle (2 each)			
³ /8" SS Swivel			
Fenders (2 each)			
Watertight hatch			
Shore power wiring			
T-handle			
STBD FWD DECK LOCKER			
Alongside lines (8 minimum)			
Fenders (2 each)			
Window washer reservoir			
Window washer pump			
Window washer tubing			
Washer pump junction box			
Deck light box			
Watertight hatch			
PORT AFT DECK BOX			
Drouge/Grapnel line 2" DBN (200'			
with 2" S/S thimble, 3/8" S/S swivel,			
³ /8" S/S shackle)			
Drogue small			



XI. Main Deck (continued)

	Std.	Non Std.	Remarks
Drogue large		ota.	
Marline (1 roll)		
Chafing gear			
Shackles as necessary			
Heaving lines (2 each)		
Watertight hatch			
CENTER AFT DECK BOX			
Wire/Kevlar bridle as req. (Optional)		
DBN bridle as req.			
Block and tackle assembly for mast			
Skiff hook with pendant			
Grapnel hook			
STBD AFT DECK BOX			
Engine room bilge suction			
Lazarette vent			
Watertight hatch			
3" drop pump pick-up hose			
Drop pump sea suction connection			
Drop pump fire hose 50' w/nozzle			
Drop pump with can			

REMARKS:			 	
	- 	 	 	



XII. Superstructure

	Std.	Non Std.	Remarks
Windows			
Windshield wipers/washers			
Enclosed steering overhead exterior			
Port/starboard running lights			
Shore tie receptacle/box			
Hand rails			
Auxiliary space vents			
Forward compartment vent			
Boat hooks 8ft/holders			
Exterior bulkheads			
Engine room vent			
Engine room vent damper			
Fuel fill/sounding rod			
Ladder to open steering			
Tow reel switch			
D-rings			
Steplight (8 each)			

REMARKS:	 	



XIII. Hull

	Std.	Non Std.	Remarks
Port hull plating			
Starboard hull plating			
Transom			
Underwater body paint			
Above water paint			
Exhaust ports			
Bilge pump discharge ports (5 ea	ich)		
Sink/HVAC drain port (1 each	ch)		
HVAC R/W discharge port (1 ea	ch)		
Rub rails			
Hull zincs			
Hull numbers and lettering			

REMARKS:	 		
	 	<u></u>	



XIV. Dockside Trials Port Engine

		Std.	Non Std.	Remarks
Proper operation of EI	OM .			
Oil pressure	(5 psi min.)			
Water temperature	(160-185)			
Reduction gear oil pres	ssure (250-290)			
Hydraulic oil pressure				
Engine idle speed	(750 rpm)			
Low idle speed	(600 rpm)			
HVAC Operation	(w/sea power)			
Engine start and stop	(3 locations)			
Steering operation	(4 locations)			

REMARKS:	 	



XV. Dockside Trials Starboard Engine

		Std.	Non Std.	Remarks
Proper operation of EDI	M			
Oil pressure	(5 psi min.)			
Water temperature	(160-185)			
Reduction gear oil press	sure (250-290)			
Low Hyd. Pressure warr	ning light			
Fire alarm/warning light	t			
Engine idle speed	(750 rpm)			
Low idle speed	(600 rpm)			
Engine start and stop	(3 locations)			
Station control panel op	eration			

REMARKS:	



XVI. Under Way Trials Port Engine

		Std.	Non Std.	Remarks
Oil pressure	(49-70)			
Water temperature	(160-185)			
Reduction gear oil pres	ssure (250-290)			
Full power	(2100 rpm)			

REMARKS:		 	



XVII. Under Way Trials Starboard Engine

		Std.	Non Std.	Remarks
Oil pressure	(49-70)			
Water temperature	(160-185)			
Reduction gear oil pre	ssure (250-290)			
Full power	(2100 rpm)			

REMARKS:		 	
		 	



Appendix D 47' MLB Disabling Casualties

Overview

Introduction

This appendix contains disabling casualties for the 47'MLB. Refer to Chapter 5, Section A for steps to follow if any of these casualties occur.

In this appendix The disabling casualties list covers the following subject areas:

Title	See Page
Engine parameters	D-3
Engineering system components	D-3
Electronic/ navigation	D-3
Safety	D-4
General material	D-4





Disabling Casualty List

Engine parameters

- Reduction gear pressure below 230 PSI (while engaged).
- Engine lube oil pressure below 49 PSI (at cruising speed).
- Engine fresh water temperature below 140 degrees or above 220 degrees.

Engineering system components

- Engine fails to start.
- Uncontrollable overheat.
- Metallic/non-metallic noise: metal on metal/fuel-knock/bearing/clicking.
- Excessive shaft or engine vibration.
- Engine surging/over speed (over 50 RPM).
- Loss of engine governor control.
- Reduction gear fails to engage (forward or reverse).
- Fuel oil dilution 2.5% or above.
- Water in engine lube oil (emulsified white milky oil).
- Lube oil in engine jacket water.
 - More than a light sheen.
 - Floating unmixed lube oil separated from the water.
- Alternator failure.
- Continuous electrical breaker trip.
- Starting batteries won't charge.
- Steering system inoperative.
- Engine motor mount hardware loose or missing.
- Excessive shaft packing leak:
 - Packing while rotating trickle or steady stream.
 - Packing while not rotating more then 15 drops per minute.

Electronic/ navigation

- No electronic means of signaling distress (i.e. no radio etc.).
- Electronics won't energize.



Safety

- Any fuel oil or lube oil dripping* on a hot surface (hot surface is defined as a surface greater than 400 degrees, even if covered by insulation).
- Electrical arcing and sparking.
- Turbo-charger lube oil supply line leaking on to hot surface or not fire rated/fire sleeved.
- Return fuel oil line leaking in the vicinity of the turbocharger where the turbo attaches to the saddle.
- Fixed (CO₂) fire fighting system inoperative, PLUS no portable fire extinguishers (unserviceable).
- Emergency alarms inoperative (fire, bilge, lube oil pressure, high water temp).
- * To determine if fuel oil or lube oil dripping is occurring, a clean sheet of paper may be placed under a suspected leak to collect and detect any drops that fall

General material

- Hull breach below the waterline.
- Inoperative (closed) sea-chest valve.



Appendix E 47' MLB Restrictive and Major Discrepancies

Overview

Introduction

This appendix contains restrictive and major discrepancies for the 47'MLB. Refer to Chapter 5, Section A for steps to follow if any of these casualties occur.

In this appendix This appendix the following information:

Title	See Page
Restrictive Discrepancies	E-3
Major Discrepancies	E-5





Restrictive Discrepancies

Engine and vessel systems

- 1. Engine Performance
 - a. Maximum RPM (norm 2100-2200) less than 2100 rpm
 - b. Engine fresh water temperature below 212 degrees and above 185
- 2. Leaks more than 15 drops per minute:
 - a. Jacket Water
 - b. Raw Water
 - c. Lube Oil
 - d. Hydraulic Oil
 - e. Reduction Gear Oil
- 3. Any fuel oil dripping* (falling onto a surface which is not hot) within ten (10) minutes.
- 4. Bilge pumps inoperative.
- 5. Bilge system check valves installed improperly or unserviceable.
- 6. Inoperative/inaccurate pressure/temperature alarms or gauges/EDMs.
- 7. Any detectable exhaust leaks.
- 8. Missing exhaust lagging or system blankets.
- 9. Failure of any emergency system:
 - a. Fuel shut-off valves do not fully close.
 - b. Engine blower shutdown is inoperative (manually from open or enclosed steering.
 - c. Engine room air dampener shutdown system.
 - d. Emergency Window Release System (EWRS).
 - e. DDEC Emergency Back-up Panel.
- 10. Loose/missing fittings, nuts, bolts, brackets, etc.:
 - a. Missing or loose shafting bolts:
 - 1) Torsional coupling.
 - 2) Cardan shaft.
 - 3) Gear output flange.
 - 4) Spacer.
 - 5) Propeller shaft flange and/or lock wire missing/broken.
 - b. Steering system:
 - 1) Rudder post nuts.
 - 2) Steering ram mounts.
- 11. Undersized engine mounting bolts and/or constructed of inferior grade material.
- 12. Battery boxes missing or not secured properly

^{*} To determine if a fuel oil dripping is occurring, a clean sheet of paper may be placed under a suspected leak to collect and detect any drops that fall



Boat outfit

- 1. Fire extinguishers not secured in brackets.
- 2. Loose/missing fittings, nuts, bolts, brackets, etc.:
 - a. Missing/loose/undersized coxswain chair mounting hardware.
 - b. Mast support bracket hardware loose/missing.
- 3. Underweight CO2 bottle.
- 4. CO2 system pressure switches not operating properly.
- 5. SAR vests pyrotechnics or strobe lights unserviceable/missing.
- 6. Boat pyrotechnics unserviceable/missing
- 7. Portable dewatering pump kit incomplete/inoperative/missing.
- 8. Towline less than 100' of required length.

Electronics/ navigation

1. Compass

- a. Deviation table missing.
- b. Compass deviation over 5 degrees.
- c. Fluxgate Compass inaccurate over 5 degrees.
- 2. Electronics
 - a. VHF radio inoperative.
 - b. Depth sounder inoperative.
 - c. DGPS/GPS inoperative.
 - d. Radar inoperative.

General materiel and safety

- 1. Water Tight Integrity
 - a. Holes/cracks in a watertight structure.
 - b. Cracks through a watertight scuttle/hatch.
 - c. Failure of a watertight closure to seal.
 - d. Loose dogs/dogging arms on watertight doors/hatches/scuttles.
 - e. Any noticeable gap at gasket seams.
- 2. Applied non-skid on main decks ineffective/missing (any traffic/working area without non-skid for an 8.5" X 11" area).
- 3. Navigation light/s inoperative.



Major Discrepancies

Engine and vessel systems

- 1. Leaks less than 15 drops per minute:
 - a. A. Jacket Water
 - b. B. Raw Water
 - c. C. Lube Oil
 - d. D. Hydraulic Oil
 - e. E. Reduction Gear Oil
- 2. Any fuel leak (piping/fittings/tank) that drips less than one (01) drop within ten (10) minutes.
- 3. Bilge pump hoses missing hose clamps.
- 4. Loose/missing fittings, nuts, bolts, brackets, etc.:
 - a. A. Hardware on the engines used for attaching equipment.
 - b. B. Battery terminals loose or corroded.
 - c. C. Autopilot pump mounting hardware.
 - d. D. DDEC cables loose or disconnected.
- 5. Flexible hoses and gauge lines used for petroleum based products not either fire rated or fire sleeved (fire sleeve properly banded at both ends).
- 6. Fluid levels below minimum required.
- 7. Engine guards inadequate/missing around moving machinery.
- 8. Protruding exhaust lagging securing wire.
- 9. Any standard boat machinery, with the exception of those listed on the disabling or restrictive list, not operating properly.

Boat outfit

- 1. Improperly stowed or secured equipment.
 - a. Porta-potti not secured to the deck.
 - b. Forward stowage bins not secured in brackets with lids secured.
 - c. Toolbox not secured in bracket with lid secured.
 - d. Stokes litter not secured in bracket.
 - e. Water jug mount loose/missing.
- 2. Hydrostatic testing of fixed/portable cylinders not completed.
- 3. Fire extinguisher PMS not recorded on equipment tag or improperly completed.

Electronics/ navigation

- 1. Compass light inoperative.
- 2. Expired deviation table.
- 3. Any standard boat electronics, with the exception of those listed on the restrictive list, not operating properly.



General materiel and safety

- 1. Watertight Integrity
 - a. Improperly filled holes.
 - b. Hardware bolted through a watertight hatch, scuttle, or bulkhead.
- 2. Scuttle not flush with the deck causing a tripping hazard.
- 3. Inability to open or close doors, hatches, or scuttles.
- 4. Hatch and scuttle safety locks do not engage when item is in the open position.
- 5. Missing breaker or open hole in any power distribution panel.
- 6. Any standard boat machinery or system, with the exception of those listed on the disabling or restrictive lists, not operating properly.



Appendix F 47' MLB Full Power Trial

Overview

Introduction

This appendix contains the full power trial requirements for the 47' MLB to ensure that the boat operates to prescribed standards.





Procedure

Conducting a full power trial

Follow these procedures when conducting a full power trial.

Step	Procedure					
1	Get the boat underway for a ten (10) minute transit on a relatively straight course. Bring the engine up to full speed.					
2	After approximately eight (08) minutes, check engine speed on the EDM. Normal engine speed range is 2100-2200 RPM.					
3	Check for the following abnormalities, which occasionally occur during the full power trial:					
	• Any fuel or lube oil dripping* on a hot surface is a disabling casualty (hot surface is defined as a surface greater than 400 degrees, even if covered by insulation).					
	• The turbocharger lube oil supply hose leaking on to a hot surface or not fire rated or fire sleeved is a disabling casualty.					
	• A leak from the shaft seal, equivalent to a trickle or steady stream, while rotating is a disabling casualty.					
	• Any leak from the shaft seal, in excess of 15 drops per minute, while not turning is a disabling casualty.					
	• Any fuel oil drop* falling within 10 minutes, not on a hot surface, is a restrictive discrepancy.					
	• Any anti-freeze, raw water, lube oil, or hydraulic oil leaks greater than 15 drops per minute are a restrictive discrepancy.					
	• Any anti-freeze, raw water, lube oil, or hydraulic oil leaks less than 15 drops per minute is a major discrepancy.					
	* To determine if any drop(s) have occurred, a clean sheet of paper may be placed under a suspected leak for up to ten minutes to collect and detect any drops that fall					
5 (cont.)	Any fuel oil leak on the fuel tank access covers greater than 15 drops per minute is a restrictive discrepancy.					
(cont.)	 Any fuel oil leak on the fuel tank access covers less than 15 drops per minute is a major discrepancy. 					



Step	Procedure			
4	Check all gauges on the console and record the readings. Refer to the following chart (See figure G-1.) for allowable ranges and results:			

Categories	Disabling	Restrictive	Major	Normal	Major	Restrictive	Disabling
Oil Pressure	<49			49-70			
Water Temp.	<140			160-185		186-220	>220
Red. Gear Pressure	<230			230-290			>290
Engine RPM		<2100		2100-2200			

Figure F-1 Allowable Ranges and Results

5	Return to the mooring. Secure both engines and check all fuel	
	fittings.	

•				
	5			
			.*	